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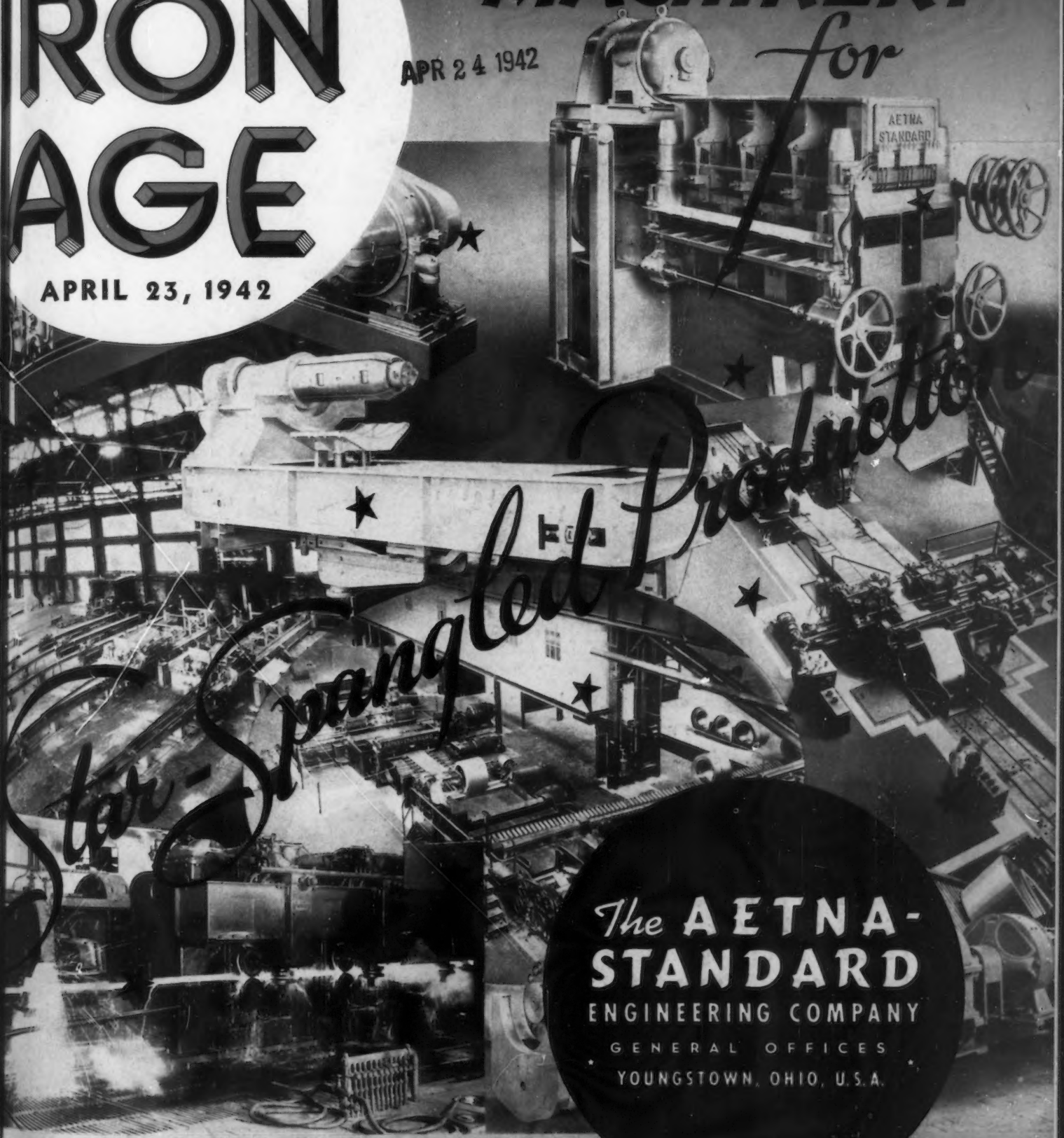
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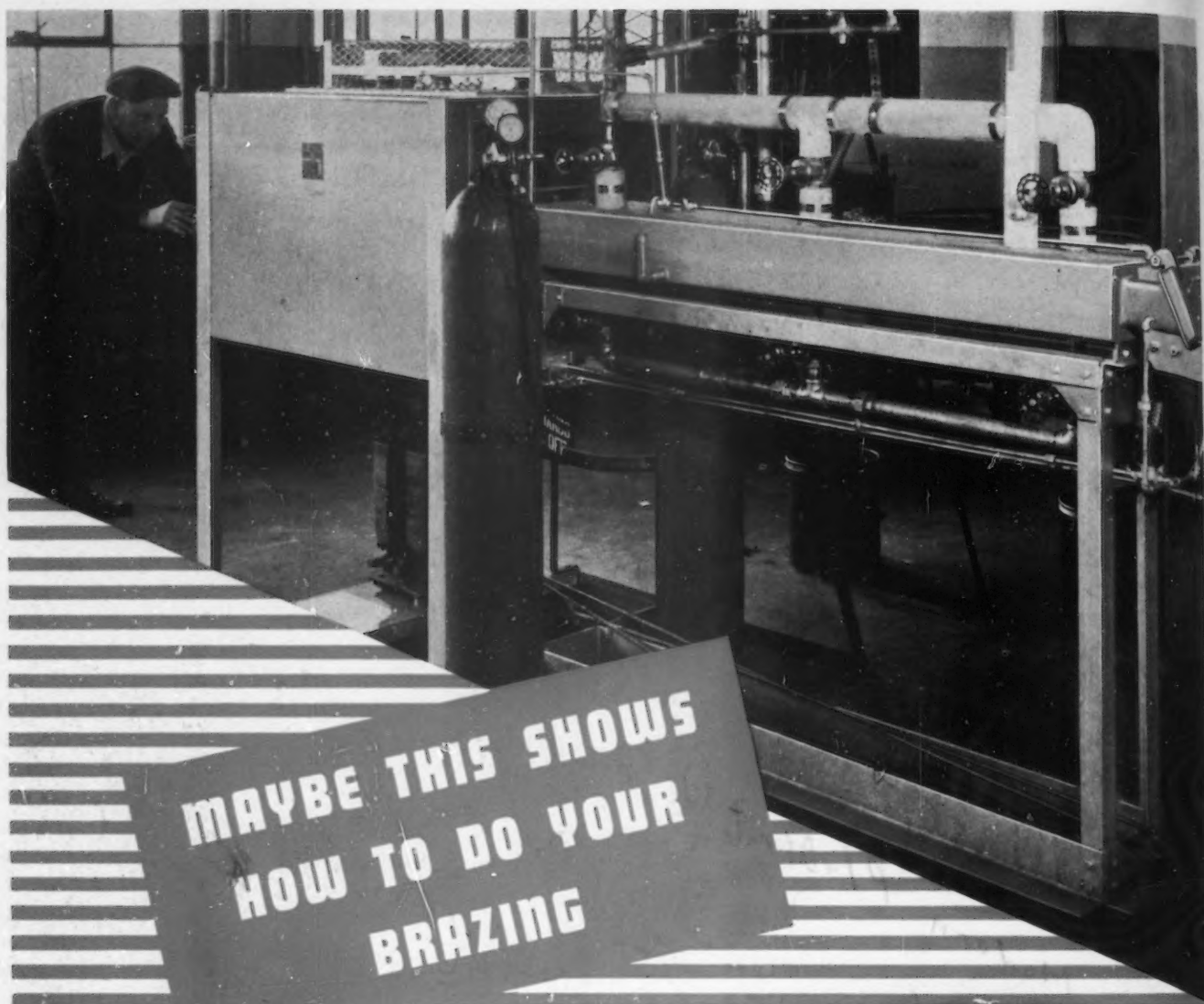
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# THE IRON AGE

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# THE IRON AGE

• •  
APRIL 23, 1942

• •  
ESTABLISHED 1855



## *Financing Post War Consumption*

TODAY we all appreciate that every possible ounce of mental and physical energy must be devoted to winning the war. So some of you may say that talking about post war things now is a bit premature.

I find some people, however, who are a bit gloomy about what is going to happen to us after the war because of the great multiplication of producing capacity that is taking place and the tremendous addition of workers to industry caused by our war efforts. They feel that profits and wages and dividends will be in for some drastic steam-rolling after the duration and that a large number of the people now and presently to be employed will be, so to speak, "out on their ears." And the thought of that makes them less cheerful than they should be to tackle the job now to be done in the best possible manner.

Under these circumstances, a cheerful thought or two about where the money is coming from to finance post-war consumption may not be amiss.

For some months immediately after we have won the war, it will be coming from Uncle Sam's pocketbook and his ability to borrow, just as it is coming now. That will be the period of "reconversion" of our factories back from war work to peace products. How long that will be is anyone's guess. If the average time to convert is a year, it will probably take that long also to reconvert.

After that, the money to finance our enlarged consumption will come from two principal sources. First, the lowered cost of production and prices of goods that will follow our present intensive speed-up of invention and industrial methods. We will be far more efficient producers.

The second source of our increased purchasing power will come from the money that we have formerly thrown into the ash can. We are learning now to get more out of what we have by wasting less. And this lesson is going to carry over and make us better stewards of our possessions.

Through this combination of more efficient production of goods and better stewardship of them by consumers, I believe that we shall have an increased purchasing power after the war of 30 to 40 per cent even with no increase in total national income.

That ought to enable us to make our payments to the tax collector and leave considerable over for financing the purchase of more goods for more people.

*J. W. Van Dusen*



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# Rapid Metallurgy in War Production

**T**HERE have been many new and interesting developments in rapid metallurgy, here and abroad during the past few years, that have not yet been fully appreciated or put into use by the American iron and steel industry. Among the more important developments, air conditioning and desulphurizing at blast furnaces offer commercially practical and proved methods of accelerating the metallurgical reactions involved in the iron and steel making process. Either one or both of these processes can be installed at a great many, if not all, blast furnaces; and wherever used together offer the means of making 10 to 20 per cent more and better pig iron and steel with 5 to 15 per cent less coke.

Yet, additional blast furnaces are being built with steel that is now needed for war production, at a sacrifice in time which is of utmost importance now and at capital costs many times greater than that required to install air conditioning equipment and to provide practical methods of desulphurizing for obtaining increased production.

Ore concentration and sintering of flue dust offer possibilities for increasing pig iron production with present blast furnaces everywhere and particularly so in the Birmingham area. There may be some question as to the future economy of beneficiating virgin ores by present known methods, but sintering plants of present design will go on paying dividends when some of the existing and proposed furnaces go out of blast. Possibly custom sintering plants, centrally located at various pig iron centers, is the answer in some instances. But whatever is the solution, now is

**... New blast furnaces and steel making equipment vs. rapid metallurgy in the production of more and better pig iron and steel with present plant equipment, are discussed herein**

By **GEORGE S. EVANS**

*Metallurgist, Mathieson Alkali Works,  
Inc., New York*

the time to follow through with this development as a rapid and economical means of boosting production.

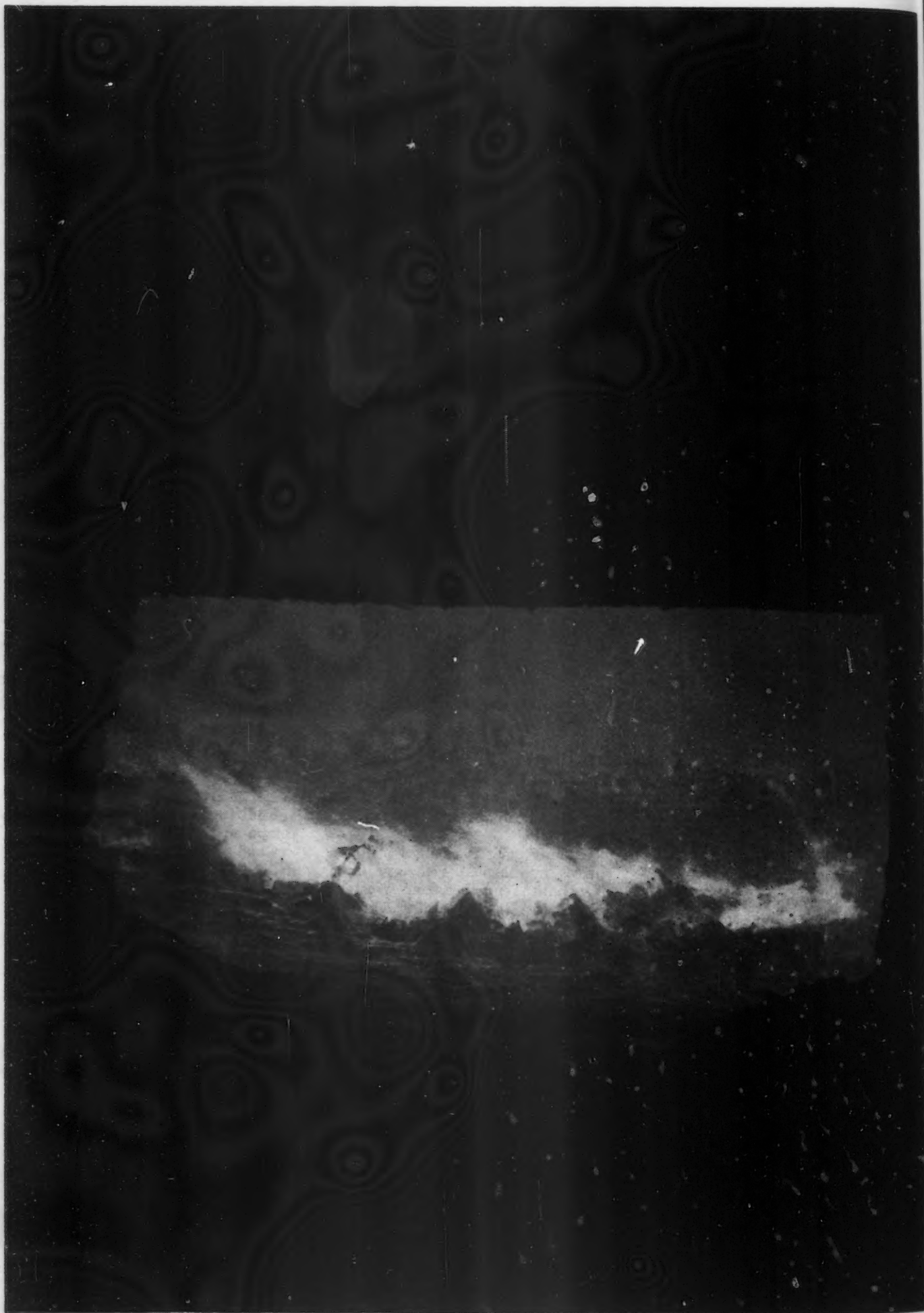
During periods of high pig iron prices in the past, rich ores from Virginia, Tennessee, and Western North Carolina containing 50 to 52 per cent iron have been moved into the Birmingham district for mixing with local red ores, containing only 33 to 35 per cent iron to increase the pig iron output. Regulated additions of these richer ores, of which millions of tons are available in the mentioned fields, increases the iron content of the burden and makes for a smoother running furnace. Thus, these ores offer the means of immediately boosting pig iron production in Southern furnaces by 10 to 15 per cent, as well as effecting considerable coke savings.

While it is not commercially practical to bring in these ores at current pig iron prices, the profitable use of these ores in the past is in itself evidence of their value in

boosting pig iron production at a price. Certainly the economy of subsidizing the users of these ores compared to the economy of building and maintaining new blast furnaces to provide an equal increase in the daily tonnage of pig iron in the district should be examined. It must be kept in mind that importation of these richer ores is an immediate possibility and would be discontinued when the emergency is over, with no further cost for maintenance and depreciation.

This plan of subsidizing industry in the modernization of plant equipment and processes would mean a radical revision of present Government policy with respect to industry, but is not too unlike the policy now followed in boosting production of farm products. As a war production measure it is equally justifiable, and like the farm program, it would get more "pigs" quickly.

It is not as though air conditioning and desulphurizing at blast furnaces and some of the other proc-





esses of rapid metallurgy are new or untried. The effect of air conditioning upon blast furnace operations was predicted more than 50 years ago, and its value as a means of increasing the output of pig iron actually proven on a commercial scale over 35 years ago. Owing to the high initial cost of the earlier equipment, large amounts of power required in its operation, and high maintenance costs, the earlier installations did not prove economically practicable at that time. The same can be said of automobiles and trucks of the vintage of 1906, and by comparison, air conditioning systems and equipment have been improved about as much as the automobile during the intervening period. However, until just recently air conditioning has gone unnoticed by the industry and even now is disputed.

Perhaps it cannot be said with authority at this time which type of equipment is best or whether a one-grain or a three-grain system will prove more economical. It can be said without fear of contradiction, however, that air conditioning equipment capable of economically handling the volume of air required for 500 or 1000-ton furnaces has long since been perfected. Furthermore, it can be said that the economy of air conditioning at blast furnaces and its effect in increasing the production of pig iron has been sufficiently well proved long enough ago to have been installed at many more existing furnaces by now and to have been incorporated in the design of all instead of a limited number of the furnaces now being constructed.

Data on hand indicates installation costs of any one of several three-grain systems at a 1000-ton furnace will average less than \$150,000, require less than 90 tons of steel, can be installed in a comparatively short time, and, varying with the location and season, is good for 100 to 250 tons added output of pig iron and a saving of 50 to 250 tons of coke per furnace day. It requires little, if any, additional power per ton of iron for operation of the air conditioning equipment and maintenance costs no more than that for the blast furnace assembly as a whole. The construction cost, time, and amount of steel used in building a modern 1000-ton blast furnace, compared with similar factors in air conditioning such a furnace are shown in Table I.

These and other data relating to furnace operations, with and without air conditioning, time and cost

of installation, as well as data on maintenance costs of modern air conditioning equipment, is published information of indisputable accuracy and has been available for a time to everyone.

The elements of time, costs in money and materials favor air conditioning, yet more new furnaces are being built instead of promptly equipping 100 or so of the modern stacks. Furthermore no provision has been made for economically increasing production by air conditioning many of the furnaces being or to be financed and constructed under the Government expansion program.

#### Desulphurizing Pig Iron

The use of the alkalies for desulphurizing and refining molten cast iron in the ladle and the effect of that treatment upon the properties of a gray iron casting was first mentioned in the literature during the 1850's. British patent No. 2282, "Improvements in Treating Cast Iron," issued to Thomas Horsley in 1867, describes in some detail the treatment of cast iron in the ladle with the alkalies and made claims for the advantages of the process at that time. This anticipated in substance about all that has since been published on the subject. Quoting from this patent:

"The object to be attained is by fluxing and purifying the cast iron whilst in a state of fusion—either as it runs from the blast furnace or from other remelting furnaces to convert it into a clear (clean) and hard (dense) substance for the casting of steam and other cylinders, bearings . . . retorts, and other articles, and to produce iron more convertible into steel. . ."

In the years immediately follow-

ing, others described desulphurizing with sodium carbonate or soda ash, reporting on the sulphur reduction by the treatment and its effect upon the cleanliness and fluidity of the metal, and upon the structure, soundness and machinability of gray iron castings.

Desulphurizing with the alkalies on a commercial scale started in both the European and American foundry industry in the early 20's for two reasons. First, desulphurizing was an economical development to use the vast accumulation of iron and steel scrap dumped upon the market both here and abroad following the first World War, and second, was a quality development, to cope with the inferior quality foundry coke made during the period of activity following the war. The process has since been adapted to the European iron and steel industry in a program of national economy. During this period the American iron and steel industry, almost to a plant, has played with desulphurizing but without any really serious attempt to engineer and build a practical system of desulphurizing as an integral part of iron and steel producing operations.

From the information at hand, it appears that the value of the extra tonnage of molten iron coming with the use of leaner blast furnace burdens and desulphurizing will more than pay for the cost of the treatment in many locations. At other points favored with both rich ores and low sulphur coke, any average charged to desulphurizing would be made up in large part at the open hearth due to the combined advantages of lower silicon and lower sulphur iron obtainable with proper desulphurizing prac-

TABLE I  
Blast Furnace Construction vs. Air Conditioning

	1000-Ton Blast Furnace	
	New Furnace	Air Conditioning Equipment
Complete cost, approximate	\$3,000,000	\$150,000
Iron and steel required	6500 tons*	90 tons
Building time	15 to 20 months	4 to 6 months
Daily pig iron production per 1000 tons of steel in plant	155 tons	1100 to 2700 tons
Capital investment—daily ton output	\$3000	\$1500 to \$6000

\* Not including steel used for coke plant construction.

tice. However, considering the present need for greater tonnages of both pig iron and steel, it will be agreed that a few cents per ton in costs is now of secondary importance.

On the basis of tests at blast furnaces, it would appear that by simply leaving off that amount of limestone required for reducing sulphur in the furnace from an average of 0.07 to 0.035 per cent or from 0.06 to 0.025 per cent and desulphurizing the iron in the ladle to an equivalent extent, that an increase in output of pig iron of 5 to 7 per cent or more could be obtained.

#### Silicon Content

At most plants the furnace is burdened to produce hot metal for the open hearth with 0.90 to 1.05 per cent or higher silicon; although lower silicon iron ranging from 0.60 to 0.80 per cent is to be desired from an operating standpoint. Sulphur contents of the hot metal is usually held 0.025 to upwards of 0.04 per cent, varying at different locations depending upon the quality of the coke and ores or the grade of steel being made.

Physically hot iron averaging 0.70 per cent silicon can be regularly produced in the blast furnace, at an increase in sulphur of some 8 to 10 points at locations favored with low sulphur coke and high grade ores, or at an increase of 15 to 30 points sulphur under less favorable conditions, with some increase in the output of pig iron resulting. This additional sulphur can be removed in the ladle with the alkalies at a cost of 20 to 35c. per ton, including reagent, ladle lining maintenance, and labor.

Perhaps it cannot be said with authority what increase in pig iron and steel ingot production would result with this practice, but it would be substantial. Neither can it be said just what the added cost or savings per ton would be under different conditions. But considering that some saving in coke would be made at the blast furnace and considering that each pound of silicon added to the open hearth in the pig iron requires in the neighborhood of 10 lb. of limestone and the formation of about an even volume of slag in its removal, at a cost of both furnace time and fuel, it would seem that the combined value of the increased production of pig iron and steel would offset the cost of desulphurizing many times over.

Something of the value of the refining that comes with desulphuriz-

ing molten iron can be appreciated when it is considered that, with proper adjustment of silicon and manganese by alloy additions and in some cases graphitizing, thin stove plate castings as well as high test iron castings are regularly being made today with refined cupola iron from mixtures made up of the very lowest grades of cast iron scrap, including some burned grate bars. Also similarly desulphurized and refined cupola iron is being used as hot metal charges in open hearth practice in the production of high quality alloy steels, where before it was the custom to use only selected grades of pig iron in making these same steels. This serves to illustrate the improvement in physical properties of molten cast iron coming with desulphurizing that results from the action of the soda slag in washing out entrained silicates or slags and unreduced oxides. This refining action of alkali slags along with the removal of even only limited quantities of sulphur offer possibilities in the production of quality steels not yet appreciated.

#### Desulphurizing Practice

Desulphurizing at blast furnaces in America got off to a bad start. This was due to the failure of operators to take into account the chemical reactions and physical phenomena involved in desulphurizing with the alkalies, and their failure to provide proper equipment and practical methods for carrying out the process in regular blast furnace practice. However, it is now known that, with proper equipment, desulphurizing at blast furnaces is entirely practical. This has been proved in tests in the industry and by large scale applications of desulphurizing abroad. It will require some extra effort on the part of blast furnace operators, but once a practical system is established, desulphurizing operations will go along like clock work, as in hundreds of foundries today.

There is no question but that desulphurizing offers the means of quickly and materially increasing production of pig iron and steel at this time of emergency. Desulphurizing will most certainly prove profitable at many locations once the system is installed as regular blast furnace or open hearth routine practice, and full use is made of the lower silicon and lower sulphur irons obtainable in this way.

A year or so ago perhaps, it

might have been said that the value of desulphurizing had for its purpose the sale of more soda ash. This is not true today. There is already a serious shortage of alkalies and to provide the tonnage of soda ash that would be required for treating even limited tonnages of pig iron would necessitate withholding alkalies from present consumers who are engaged in non-war production.

#### Increasing Steel Output

Applications of rapid metallurgy offering possibilities for quickly expanding the output of both ingots and steel castings include various duplexing processes with desulphurizing and/or dephosphorizing in the ladle. Some expansion in duplexing at steel plants is under way at this time, but it is not known that desulphurizing is contemplated except at one location.

At outlying plants not having hot metal, cupola-open hearth duplexing with desulphurizing offers the means of quickly increasing the output of ingots by 15 to 20 per cent. This process is now in use at two plants, and is under consideration at others. Buildings and equipment, including cupolas, holding and desulphurizing ladles, and auxiliary equipment for supplying metal for a battery of three or four 100-ton open hearth furnaces can be installed for about one-half the cost of one such open hearth and in about one-third the time required for building a new furnace. At most locations, costs of ingots compared to costs of cold charging will not vary greatly, one way or the other. The process does, however, offer the advantage of adding flexibility both as regards raw materials and output.

Cupola-converter-electric furnace triplexing with desulphurization of the iron between the cupola and converter is now practiced at several electric steel foundries with one plant producing ingots of ordnance quality. In this process, low grade steel scrap unsatisfactory for electric furnace charging is melted in the cupola together with pig iron or ferrosilicon to provide an iron with silicon of 1.25 to 1.50 per cent. The iron is desulphurized in the ladle with soda ash between the cupola and converter, and the metal then blown and transferred to the electric furnace for final treatment.

Plans are underway at one plant to dephosphorize the blown metal between the side-blow converter



and electric furnace by the Yokum process of ladle treatment. Thus, 60 to 70 per cent or more of both the sulphur and phosphorus in the iron, as it comes from the cupola, will be removed by ladle treatment. This will make possible the use of lower grades of scrap and less costly ferro-alloys in the production of electric furnace quality steels. This triplexing process offers the means of more than doubling electric furnace production at many present plants. The process is proving commercially practical under existing conditions and still offers much promise.

Prior to the advent of desulphurizing cupola iron by ladle treatment and the practice of melting high percentages of steel scrap in the cupola, converter steel found-

dries were limited to the use of high priced raw materials. Even with the best available materials, by this process it was impractical to produce castings with sulphur contents below 0.07 to 0.09 per cent. With the development of desulphurizing and advancements in cupola melting practice, it is now possible to use an all-scrap steel and ferrosilicon charge in the cupola, and, with the side blow type converter, produce uniformly high quality steel castings with sulphur contents well under 0.05 per cent, meeting most exacting specifications. Consequently this old, economically and metallurgically sound process of rapid steel production which was all but advertised out of existence by the electric

power companies a few years ago is now coming back strong, and, if history repeats, offers promise of still further developments under post-war conditions.

The practices enumerated taken together certainly promise an appreciable low cost increase in the output of pig iron and steel with present plant equipment. Air conditioning and sintering plants can be installed in a matter of months; richer ores in plentiful supply can be mined in a matter of weeks; and desulphurizing can be put into use at many blast furnaces in a few days time. Similar savings in time, costs and equipment can be had by the use of desulphurization and duplex or triplex methods of steelmaking.

## Hard-Facing Cams

**I**NCREASED production and lower replacement costs on nail machines are being secured by a midwestern steel mill by hard-facing the cams with Haynes Stellite alloy. Prior to the adoption of hard-facing, the cams were case hardened and when they became too worn for efficient operation they were simply scrapped. Now that all cams are hard-faced there is less

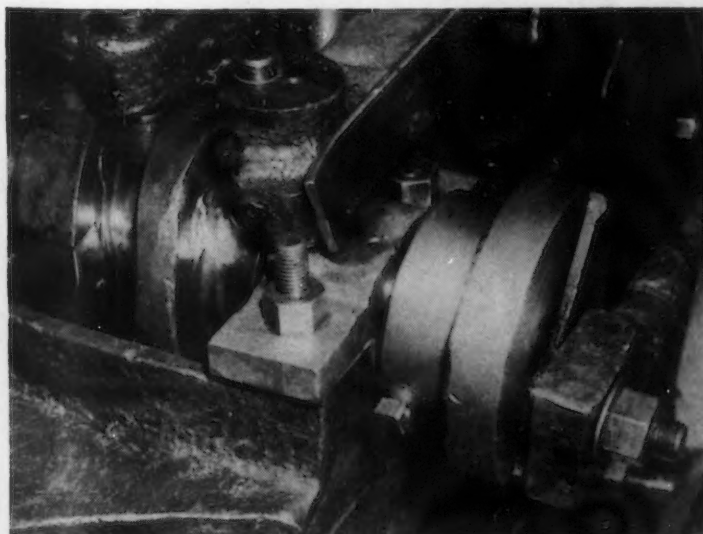
wearing of the surface, less downtime on the machines, and worn cams can be refaced with the same alloy any number of times. Fig. 1 shows one of these cams in operation.

Fig. 2 illustrates the method of applying No. 6 Haynes Stellite rod as the hard-facing alloy on an SAE 1010 steel cam by the oxy-acetylene process. That portion of the cam

which is not being worked on is kept under water to prevent warpage. The alloy deposit is then ground by hand to finish the cam.

The hard-faced cam lasts several times longer than the case hardened type, reducing idle time of the nail machines. When it does wear down it can be refaced for \$5 as against a cost of \$20 for a new cam.

**FIG. 1**—Hard-faced cams (left) in high speed nail machines show excellent resistance to wear and can be refaced when necessary.



**FIG. 2**—Oxy-acetylene process applies Haynes Stellite alloy while part of cam is submerged in water to prevent warpage.



# Aluminum Permanent M

**... This is a review of current practice of one of the foremost producers of aluminum castings in permanent molds, including descriptions of some unusual castings used in aircraft and mobile ordnance units.**

• • •

**A**LTHOUGH aluminum permanent mold castings have long held an established reputation, the demands of the war program are substantially widening the fields of this type of casting. Permanent mold castings are being produced in commercial quantities

today which a short time ago were not considered feasible.

This is true not only with respect to the physical qualities of the castings, but also to design and size. Typical of work which can be done in permanent molds today is the combination flywheel-fan casting

shown in Fig. 2. This casting, which must meet exacting military standards, is 34 in. across and weighs 55 lb. and is believed to be one of the largest aluminum permanent mold castings ever produced in commercial quantities.

Many castings previously made in sand are today being converted to permanent mold work. This is especially true in aluminum, where it has been found that casting weights can be lowered somewhat in permanent molds, in addition to the important savings possible in valuable machining time due to the finer tolerances which can be held. An improvement in physical properties has also been noted in permanent mold castings as compared with sand castings.

Makers of various components



• • •

**FIG. 1**—Four ladles are used to pour the 55-lb. flywheel-fan casting, shown on the opposite page, in this mold. Toggles for locking the radial slides are visible in the foreground.

• • •



# Permanent Mold Castings

By E. G. FAHLMAN  
and  
HERBERT CHASE



FIG. 2—This aluminum flywheel-fan casting, used for military purposes, has a finished weight of 55 lb. and is produced in permanent molds. It measures about 34 in. in diameter and is 6 in. high, and was cast in the machine shown in Fig. 1. The smaller piece is a sectional view. The piston gives an idea of the size of the casting.

for aircraft and tank applications appear to be profiting most by the conversion of certain sand castings to production in permanent molds. In any event, most of the production of the company whose practice is described here, is in parts of these types. This company has been highly successful in making permanent mold castings in aluminum alloys to meet both Army and Navy specifications.

Permanent molds are made largely from special grades of heat-resistant cast iron which, in service, is given a refractory coating, applied by spraying. Proper gating is of even greater importance and often requires a great deal of expensive development for particular molds to insure the high grade castings which are essential, especially for the applications considered here. Consequently, the makers of permanent mold castings are generally somewhat reticent in divulging details of mold construction and use, for these details make all the difference between castings which meet exacting requirements and castings which can be made without access to the fund of experience acquired by producers long in the business.

## Semi-Permanent Molds

Molds employed in making semi-permanent mold castings are essentially the same as those for permanent mold types, except that they are used in combination with sand cores which, as for sand castings, have to be made up for each cast-

Silicon is the only ingredient be- from the casting. Sand cores are employed to form recesses which cannot be formed by removable metal cores. However, many metal cores are employed for shapes which can be withdrawn from the casting, both in permanent and in semi-permanent molds.

When metal cores are provided, means for removing the core from the casting or of pushing the casting off the core or cores are built into the mold. Metal cores are commonly made from special tool steels which are heat treated and are resistant to the high temperatures and to abrasive action.

There are a dozen or more aluminum alloys suitable for permanent and semi-permanent mold castings, but those most used in the plant covered here include the following:

(1) The alloy commonly known as the "5 per cent silicon alloy"; silicon is the only ingredient besides aluminum in this alloy.

(2) The common "No. 12 alloy" containing about 8 per cent Cu and 2 per cent Zn.

(3) The heat-treatable 4.5 per cent Cu, 2.5 per cent Si alloy in which Fe is limited to a maximum of 1.1 per cent and the remainder Al (except for normal impurities, which are said not to impair either physical or casting properties even though present in substantial amounts.)

(4) The heat-treatable 5 per cent Si alloy containing about 1.3 per cent Cu and about 0.5 per cent Mg, the remainder being Al.

(5) The heat-treatable 7 per cent Si alloy containing about 0.4 per cent Mg, the remainder being Al.

Of these alloys, the first two, as a rule, are not heat treated, except when unusual conditions have to be met, such as extreme hardness for No. 12 or normalizing, and maximum conductivity for the 5 per cent Si alloy. The remaining three are commonly given a solution heat treatment at 960 to 980 deg. F. for a sufficient time to obtain a solid solution, followed by quenching and aging in hot water with sometimes still further aging in the 300 deg. F. range, the time and temperature

of this latter being varied to yield the physical properties desired.

#### Casting Temperature

All of the foregoing alloys meet certain government specifications, such as Federal Specification QQ-596-Class 7, Class 1, Class 6, or Class 8, and are cast at the lowest temperature which will yield satisfactory castings. This temperature is commonly 1450 deg. F. or lower, depending upon the casting and the mold design.

Makers of permanent mold castings usually employ much secondary aluminum, when specifications permit. For some alloys, however, the limits on impurities in certain specifications necessitate the use of virgin aluminum. Because of the shortage of the latter, at least one Washington authority has eased the limits of impurities for certain castings especially in the heat-treatable alloy (No. 3 above) to permit effective use of secondary aluminum.

Furnaces employed for melting the aluminum alloys are arranged for either gas or oil firing, and hold about 3500 lb. of metal. Charging is done through an opening near the rear of the furnace and the hand ladles used for casting are filled at the front of the furnace where temperatures are relatively constant.

#### Mold Gating

Molds of small size usually have a single gate filled from a single ladle, but large molds have up to four gates at each of which a separate ladle pours simultaneously. When the casting is being poured, the mold sections have to be closed, and usually are securely locked by hand-actuated toggles supplemented, in some cases, by hand clamps.

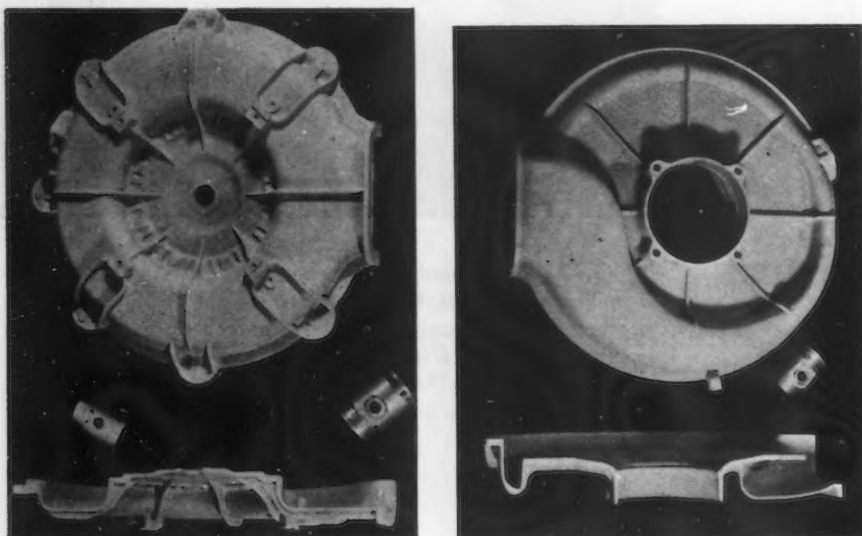
For some large molds, clamping is done, at least in part, by hydraulically operated mechanisms. Although the mold parting is often vertical, or nearly so, it has to be horizontal or slightly inclined for castings of certain shapes. Molds made in several sections sometimes have these sections moving in several directions to clear the casting and permit of its removal.

Since all pouring is done by gravity, the mold itself, as well as the parting, is so placed as to yield a sound casting and to facilitate the removal of the latter.

Of all the castings produced in the plant concerned here, that of a flywheel with ventilating blades, Fig. 2, is the largest, most complex and consequently most interesting. Because of its shape the flywheel casting, originally designed for sand casting and formerly made as such, proved very difficult and expensive to cast in sand. Moreover, when thus cast, machining and finishing were difficult and required the removal of much more metal than has to be cut away from a comparable permanent mold casting.

Of the plants which have contracts requiring the use of this casting, at least two started with sand castings and found it hard to secure them of satisfactory quality and in adequate quantities. All now use the permanent mold casting and report noteworthy savings.

A complex and expensive mold is required for this flywheel-fan casting, but its cost is amply justified by the savings realized and by the



**FIG. 3**—This supercharger section (front and back sections are shown) weighs about 20 lb. per section and has a 24-in. o.d. with a 4-in. height. The front half of the housing is cast in the mold shown here. The volute section passage of the rear section is formed with a sand core. The piston is for size comparison.





rate of production achieved in permanent molds as well as by the superior castings which result. This casting is made with its axis vertical, that is, with the diameter horizontal. Because of the vanes, the mold requires 14 sections designed to be moved radially outward to clear the casting.

To clear the casting at its bore and to form the channel section requires a core made in six pieces designed to move inward radially. These bore and channel sections are hydraulically operated, while the outer ones are moved and locked by hand toggles. The movable top section has a screw clamping device and is lifted free by a swinging crane.

*For a description of methods used in producing cast iron castings in permanent molds, see "Modern Permanent Mold Castings," THE IRON AGE, Nov. 23, 1939.*

The top section contains the four gates through which four men pour the metal, each with his own hand ladle, as shown in Fig. 1. After the casting has cooled sufficiently and the mold is opened, a hydraulic push-out lifts the casting free and the workmen, with asbestos gloves, lift it off onto the floor, where it cools further.

These castings are subsequently heat treated in an electric furnace. They are said to be much sounder than sand castings and to have much better balance, important considerations for a rotating part.

#### Mold Is Cooled

After the casting is removed, the mold is blown out and cooled by an air blast containing a water spray. The mold is then closed, the six internal sections being forced outward by a center hydraulic ram and the outer ones are moved inward and locked by the hand toggles.

After setting the cover in place and locking it, the mold is ready for another pouring. After casting, the top face is machined, cutting of the riser and uncovering metal so that porous areas (should any be found) are apparent and the casting can be scrapped if necessary at the foundry.

Two other large castings produced in this plant constitute the two halves of an aircraft engine



**FIG. 4**—Several smaller aluminum permanent mold castings, including a motor housing (upper left) which formerly was a forging. Note the many changes in section size. This housing is cast in the mold shown below. The piston is for size comparison.



supercharger shown in Fig. 3. Of these, the larger requires a sand core to form a volute passage, a part of which can be seen in the illustration of the casting which has been sawed apart. For this part, the mold, which is only slightly inclined from the horizontal, is much simpler than that for the flywheel just described as it is made in two sections.

The upper section is designed to swing about a hinge and to support the sand core. This section is counter-weighted and, when in place for casting, is held to the lower fixed half of the mold by four C-clamps. Gates are in the upper half and are filled by two ladles pouring simultaneously.

The core is supported by bolts from the upper half and the cast-



ing is freed from this half by removing the bolts. After the mold is opened the casting is ejected from the lower half by push-out pins actuated by racks from pinion shafts turned by levers.

The other half of the supercharger housing is produced in a mold having a nearly vertical parting arranged for locking by a hydraulic plunger. In this instance, one half of the die has a nearly horizontal motion and is held in a frame not unlike that of a die casting machine, although much lighter,

since the locking pressure required is moderate because the metal is poured under a gravity head. This mold is filled from two ladles. When the casting has cooled the hydraulic ram withdraws the movable half of the die and the casting is ejected from the fixed half by pins actuated by racks, pinions and levers. The only cores involved are metal pins having their axes at right angles to the mold parting.

#### Small Motor Housing

Smaller castings, such as oil filter

motor housings, Fig. 4, having hexagonal forms, require much smaller molds than those castings already described. These molds are operated by simple hand toggles. One setup of this type is shown in Fig. 4 and is used to make the motor housing.

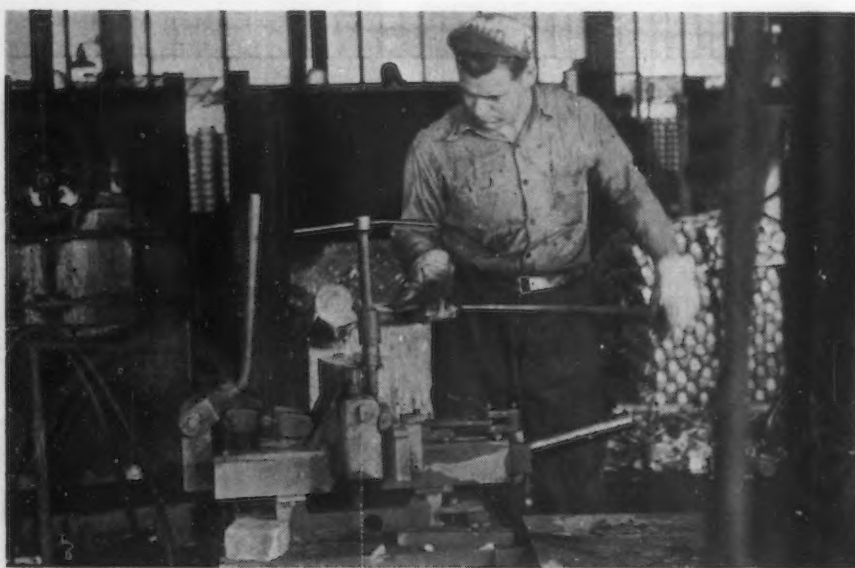
A single operator handles the mold and castings in this and many similar cases. The alloy used for this casting is of the type designated as No. 3 above, and the castings take the place of a part formerly forged, and the castings are lighter than the forging. This casting is formed over a fixed core and is ejected off the core by pulling the lever on the pinion shaft in the movable half of the mold.

Some core pins, which form small holes, are mounted on a plate in the fixed half of the mold and are operated by another lever. Molds of this size are filled by a single ladle through a single gate, but the gating again requires much attention to insure the sound castings required.

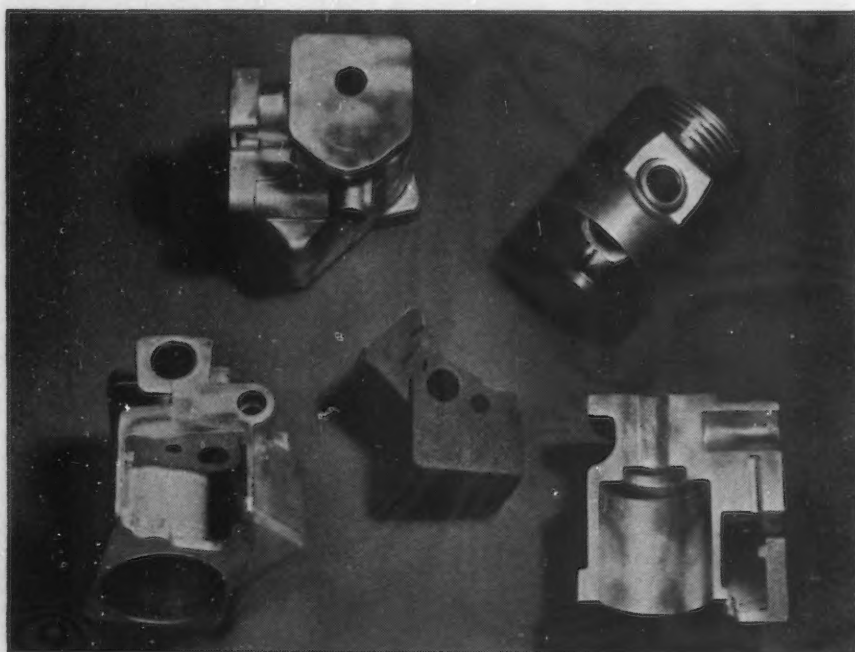
The company for which this casting is produced started to use permanent molds for two small parts initially and, having found how well they performed, now has 19 molds in use for other parts. This change took place when the production and machining of sand castings (for which most of the permanent mold castings have been substituted) became so burdensome that improved methods of casting production in adequate quantities were essential.

Makers of aircraft engines have not been so prompt in making use of permanent mold castings as the merits of such castings appear to warrant. This is attributed in part to failure to realize that certain faults of sand castings, such as the difficulty of controlling porosity, can be overcome through proper care and experience in producing permanent mold castings.

A start toward the use of permanent mold castings has been made by aircraft engine makers, however, for such parts as the supercharger housings, already mentioned, for carburetors and for the governor case used in connection with variable pitch propellers, to mention only a few. The last named casting is shown in Fig. 5 along with a sand core which is used to form a recess from which a metal core could not be withdrawn.



**FIG. 5**—A governor case cast in a semi-permanent mold. The core shown is used to form the recess visible in the lower left hand view. This casting is produced in the mold illustrated.



The type 3 alloy is chosen for this casting.

Both of the two main sections of this mold (Fig. 5) are movable and are arranged for operation in slides by toggles which provide the locking action. The sand core is positioned on a metal core pin which goes through the sand core and into a space which the metal fills, except for the volume occupied by the core.

Side core pins are actuated by rack and pinion and another cored hole is formed by a pin actuated by a pinch bar. One operator handles this mold and fills it through a single gate. That the casting is performing its function well is indicated by the fact that large quantities are being produced and many reorders have been received.

#### Aircraft Uses Increase

A recent survey indicates that some aircraft manufacturers are making very much greater use of permanent mold castings to replace sand castings in parts of fuselages and other frame elements. These frame casings do not have to be made to such close tolerances as do engine castings and often permit of tolerances of 0.010 or even 1/64 in. Such tolerances can often be held, with proper care, in permanent mold castings, making it necessary to do little machining and always much less than on sand castings. Some aircraft makers are taking full advantage of this and are often paying a premium for the permanent mold casting, though still realizing a net saving as compared with the machined sand casting.

This is true especially where the permanent mold casting can be made to fit fuselage or other contours without machining, while the sand casting has to be machined on these contours which are of a shape hard to duplicate at reasonable cost by machining.

Many of the permanent mold castings in question are made in an alloy equivalent to that designated as No. 5 previously, as this involves minimum shrinkage, making it easier to hold required dimensions.

#### Typical Applications

Applications of permanent mold castings are not confined to the automotive field although automotive manufacturers appear thus far

FIG. 6—This pump housing is an excellent example of the complicated shapes that can be cast with a semi-permanent mold setup. Piece on the right is a sectional view of the housing. This casting is produced in the machine illustrated.

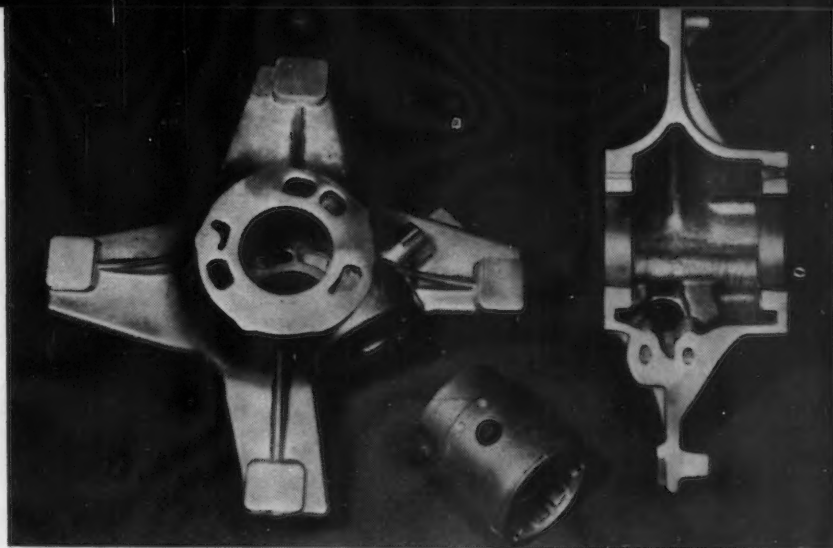
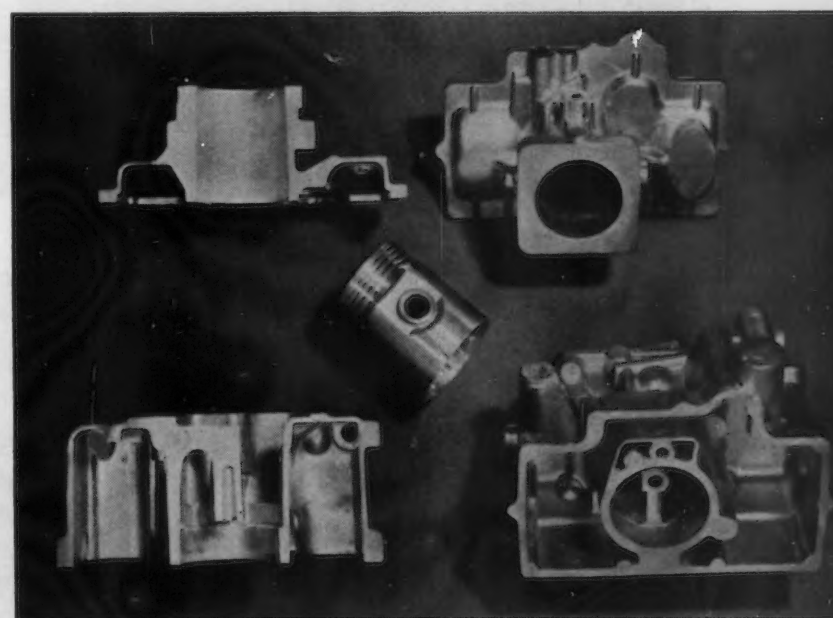
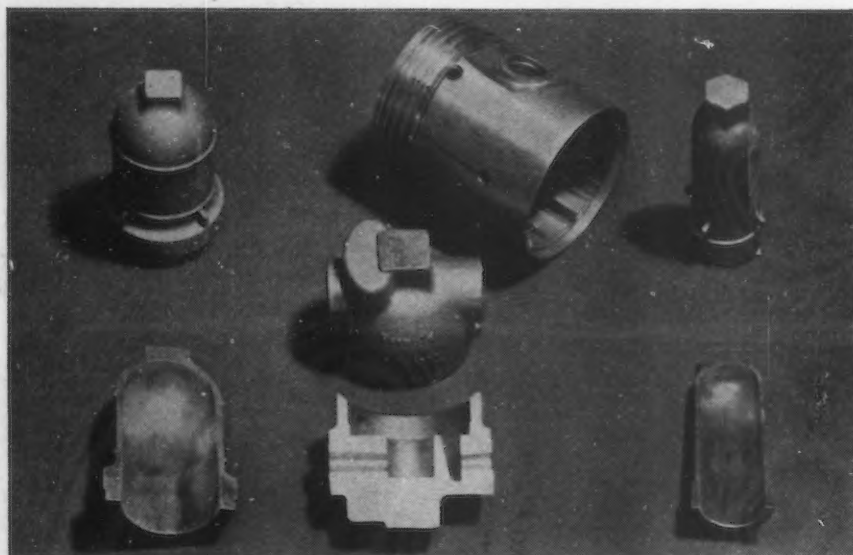
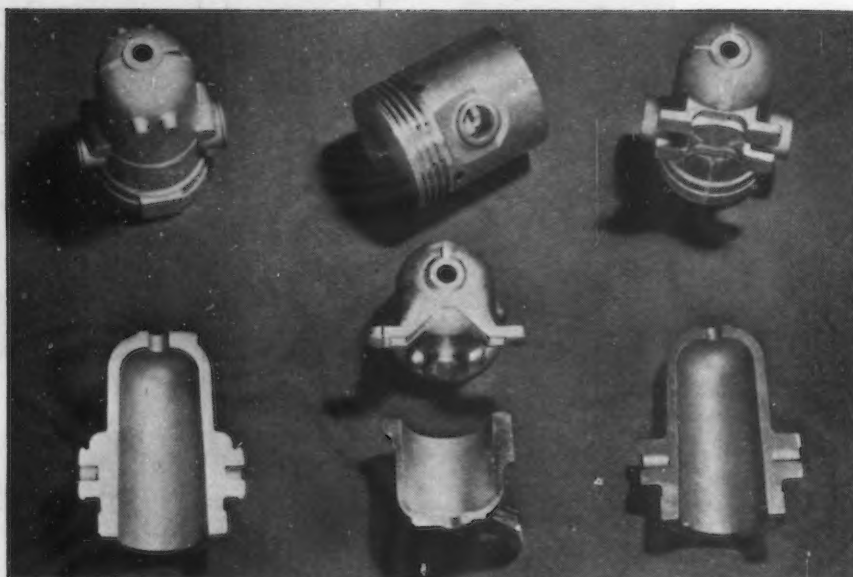


FIG. 7—A difficult carburetor body and cover which is being successfully produced in the two-gate machine illustrated. The piston is for size comparison.







to have taken greatest advantage of the process. Electrical manufacturers employ many permanent mold castings, among them being the pump housing shown in Fig. 6. This part requires the use of a sand core as well as some metal cores. Other permanent mold castings, such as agitators for washing machines, previously produced in large quantities, are now being shelved in favor of the more pressing armament applications for which aluminum alloys are essential.

Numerous other permanent mold castings produced in the plant dealt with here might be described, but the significant factors are not greatly different from those already outlined. Some typical castings are shown in Fig. 8. The molds employed necessitate a considerable initial investment, but the greater accuracy and superior finish of the castings, the saving in machine work, the relative freedom from porosity, resulting in fewer rejects and better performance, and the saving in aluminum brought about by closer dimensions and better physical properties, are said to offset mold costs if at least a moderately large total production is required.

Although a considerable number of sand castings and even some forgings have been and can be replaced by permanent mold castings, it is not to be assumed that any very large proportion of these will give way to permanent mold castings. Each of these classes of products has its merits as well as its limitations and each is indispensable in certain types of applications. Both the designer and the manufacturer need to consider relative merits and comparative limitations and then decide upon the best compromise in the light of what may or may not be available within the time allowed. It is clear that the permanent mold casting will fill the requirements in certain cases and that, where it does so, it is deserving of careful consideration.

←  
**FIG. 8**—These three illustrations show an assortment of typical permanent mold castings being successfully produced. These castings are two pump housings, and a head casting for an oil cleaner, an aircraft engine accessory, and a sump housing.



# Blast Furnace

## Air Heating

By GUSTAVUS AUER

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**S** ELECTION of the actual flame temperature to be used in the Stefan-Boltzman radiation formula (discussed last week) and for the determination of the convection heat transmitted to the heat absorbing elements in the combustion chamber is subject to considerable differences of opinion. Reasonable agreement on the use of the temperature of the gases leaving the combustion chamber or at the entrance to the shield or convection tube section, is common practice. This temperature is lower than the theoretical flame temperature, and in the case of non-luminous combustion, may be several hundred degrees lower. It is conservative, however, to use this temperature in the design calculations, as the factor of safety involved will compensate for the possible existence of fouling elements on the heat absorbing surfaces and deviations in emissivity factors.

In the design of a tubular air heater for blast furnace operation, it will be found that under average conditions, firing blast furnace gas, the temperature of the products of combustion in the radiant heating section will be too high for the metal tube even when special alloys are used. It, therefore, becomes necessary to reduce the combustion temperature by some convenient method.

Flame temperature may be reduced by the admission of excess air for combustion and by superheating the moisture introduced with the air. Radiation losses from the furnace walls and the absorption of heat by the tubular heating elements as combustion takes place simultaneously also reduces temperature. Further reductions, sub-

**. . . The selection of tube material, tube spacing and the calculation of heat transfer rates are discussed in this second of a three-part series of articles on tubular heaters for blast furnace air heating.**

ject to design and operating control, are possible by the recirculation of flue gases and the introduction of diluents such as extraneous moisture. The latter is distinctly advantageous within certain limits, as the radiant heat transfer rate can be increased by the addition of moisture and at the same time the actual temperature of the flue gases can be reduced to a practical operating range for heating air to high temperature in tubular elements.

Hottel and Egbert<sup>1</sup> have recently published information on the radiation of furnace gases and the effect of variation in the radiating components and non-radiating diluent fractions in the flue gases. Their recommendations, supported by other investigators, provide a convenient means of calculating the radiation of heat from gases to heat absorbing surfaces. They involve the determination of the radiating gas emissivity ( $P_r$ ) based on the partial pressures of the radiating constituents of the gas and the length of the radiating beam through the mass of the gas volume. The theory, based on Beer's law, indicates that at a fixed total pressure and temperature absorption depends upon the product of the partial pressure of the radiating constituent and the beam length in feet. The effective heat trans-

mission is substantially the same whether this product results from a long beam length and a low partial pressure or a short beam length and a high partial pressure.

This theory is substantiated with respect to the carbon dioxide component but is somewhat less conclusive on the water vapor. It is sufficiently accurate, however, for use in tubular heater calculations where correction factors are allowed for the effect of combined carbon dioxide and water vapor radiation on flame emissivity.

The total emission ( $P_t$ ) from combustion products containing both carbon dioxide and water vapor can be stated by the following formula:

$$P_t = E_c + E_w - K \quad (4)$$

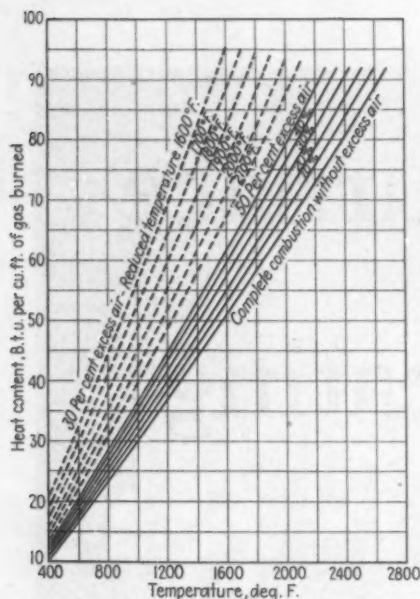
in which:

$E_c$  = emissivity of carbon dioxide component.

$E_w$  = emissivity of water vapor component.

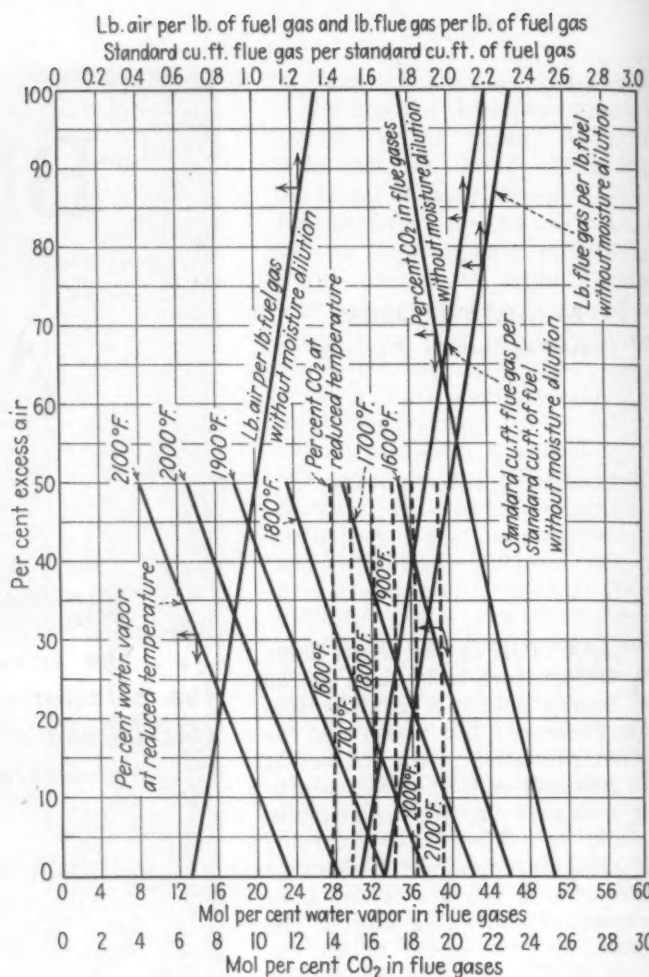
$K$  = percentage correction due to superimposed radiation for the two components.

The factors in this formula may be determined from three charts published by Hottel and Egbert<sup>1</sup>, the first and second charts providing the emissivity factors  $E_c$  and  $E_w$  for carbon dioxide and water vapor radiation respectively, and the third providing the correction



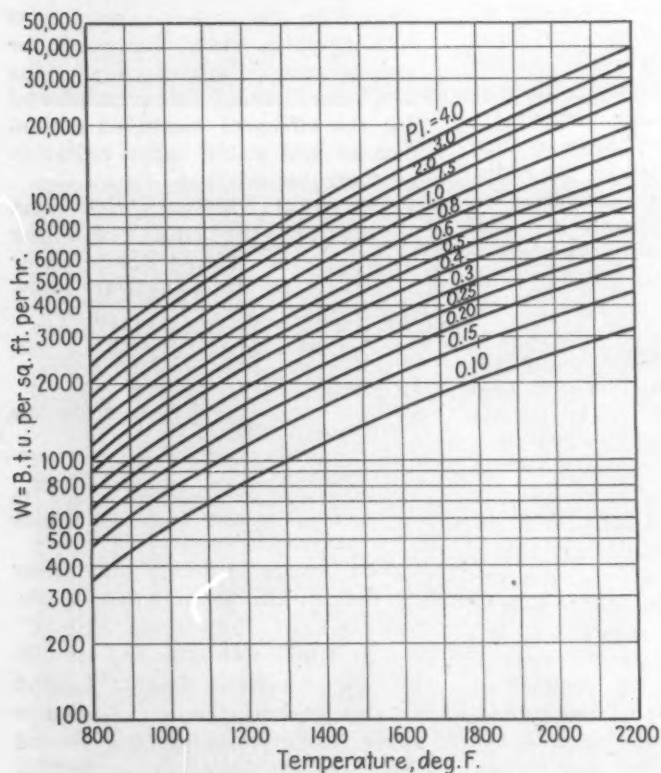
LEFT  
**FIG. 1** — The heat content, above 60 deg. F., in products of combustion, resulting from the combustion of 1 cu. ft. of blast furnace gas.

RIGHT  
**FIG. 2** — Blast furnace gas combustion, showing the pound of air per pound of fuel gas, pound of flue gas per pound of fuel gas, standard cubic feet of flue gas per standard, mol per cent  $H_2O$  vapor and  $CO_2$  in the flue gases.



factor ( $K$ ) for the combined effect of the two radiating gas components.

The emissivity factors for each component are a function of the product of  $P$ , and the partial pressure of the component gas, and the mean radiating beam length ( $L$ ) in feet. Emissivity factors,  $E_c$  and  $E_w$ , may be selected from these charts at the desired temperature and products,  $P_c L$  and  $P_w L$ , for carbon dioxide and water vapor, respectively. The correction factor is plotted for values of  $P_c L + P_w L$ , and the ratio of the per cent carbon



**FIG. 5**—Radiation resulting from water vapor.

dioxide to per cent carbon dioxide + water vapor in the gas mixture.

The mean radiating beam length used in these formulae is variable with the shape of the combustion chamber, and the proper value to use in each case may be calculated from the recommendations of Hotte, published in several of the references and conveniently presented by Lobo and Evans.

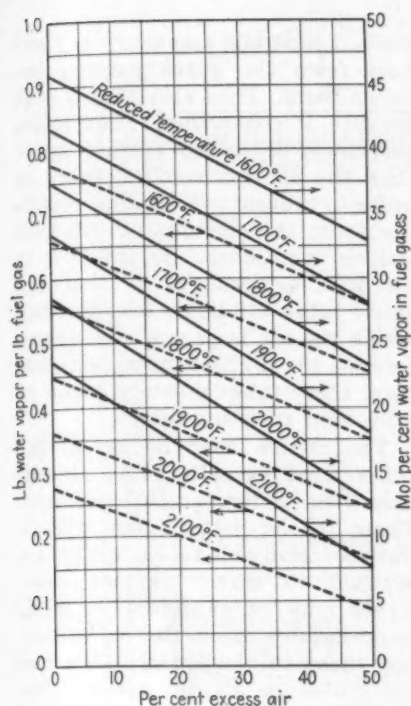
Before considering the problem of an air heater design it will be well to observe the effect of gas emissivity on radiant heat transfer at various temperatures, percentage of excess air and water vapor as a diluent. These conditions are illustrated in the accompanying charts. For the purpose of application of the radiation theory to blast furnace air heaters, the charts have been prepared on the assumption that blast furnace gas, free of dust and of the following characteristics, is the fuel available.

Fuel, blast furnace gas.

Specific gravity 1.02 (air = 1.0).

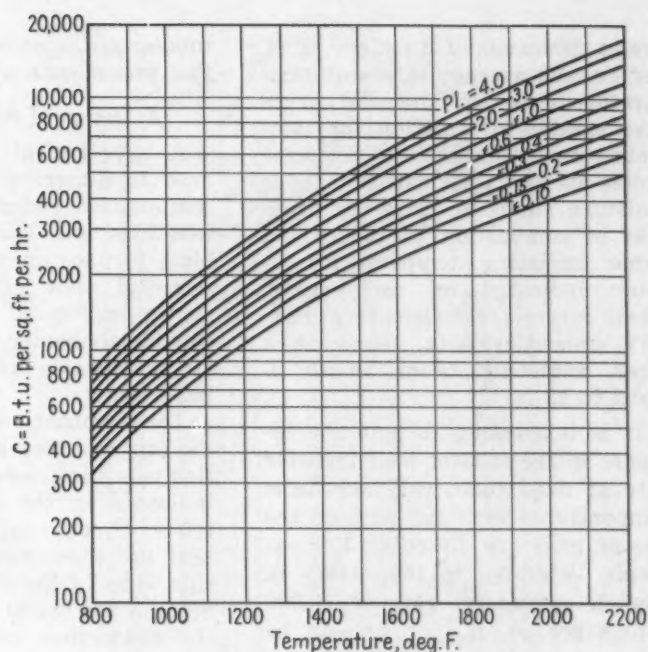
Net calorific value 91.75 B.t.u. per cu. ft.





LEFT  
**FIG. 3** — The moisture required to reduce the flame temperature in combustion of blast furnace gas.

RIGHT  
**FIG. 4** — Radiation resulting from carbon dioxide.



#### Analysis by volume:

CO<sub>2</sub> = 11.5 per cent  
N<sub>2</sub> = 60.0 per cent

CO = 27.5 per cent

H<sub>2</sub> = 1.0 per cent

Referring to the charts, Fig. 1 shows the heat content above 60 deg. F. in the products of combustion resulting from the consumption of 1 cu. ft. of blast furnace gas. The heat content is plotted against temperature deg. F. The curves indicate the heat content for complete combustion without excess air and with variable proportions of excess air from 10 to 50 per cent. The dotted curves indicate the heat content in the gas products for combustion with 30 per cent excess air and sufficient extraneous moisture dilution to reduce the theoretical flame temperatures to those indicated on each curve. The method of plotting the total and/or residual heat against temperature is extremely useful in furnace design as quick assumptions and checks may be made in the overall and intermediate heat balance calculations.

The curves in Fig. 2 indicate the amount of air required for complete combustion, the pounds of flue gas per pound of fuel gas, the standard cubic feet of flue gas per cubic feet of fuel gas and the percentage of carbon dioxide in the flue gases all of which are plotted against a variation in excess air. The lower solid and dotted curves show the

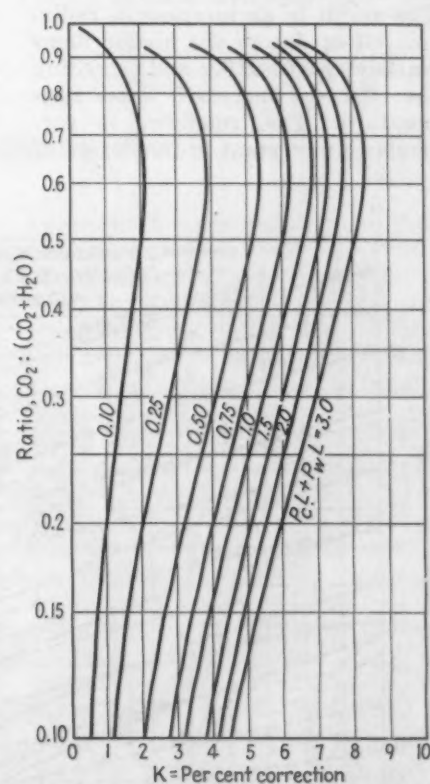
mol per cent of water vapor and carbon dioxide in the products of combustion respectively, resulting from the complete combustion of fuel gas, a variation in excess air and sufficient moisture diluents to reduce the theoretical flame temperatures to those indicated thereon.

The pounds of water vapor per pound of fuel gas and the mol per cent of water vapor in the flue gases are shown on Fig. 3 by the solid and dotted curves, respectively, as a function of the per cent excess air utilized for complete combustion at the reduced flame temperatures shown on each curve.

The usual published charts on carbon dioxide and water vapor radiation, based on Hottel's investigations and reports, are difficult to read with extreme accuracy because the necessity of reproducing charts covering a very wide range. In tubular heater design, a practical temperature range for the use of blast furnace gas in combustion is between 800 and 2200 deg. F. It has been found advantageous to plot the radiation curve to a larger scale as indicated in Fig. 4 for carbon dioxide radiation and Fig. 5 for water vapor radiation. The curves are plotted for values of PL ranging from 0.1 to 4.0 as these are the practical ranges for tubular heater designs as discussed herein. In Fig. 6, the percentage correction K, due to superimposed radiation from carbon dioxide and water vapor constituents, is likewise an enlargement of Hottel's published

chart and convenient for use in these heater designs.

The combined radiation effect of the products of combustion when firing blast furnace gas with 30 per cent excess air and flame temperatures reduced in some manner, such as surrounding the combustion chamber with sufficient cold absorbing surfaces, is plotted in Fig. 7 on the dotted curves. The coordinates



**FIG. 6** — The superimposed radiation from carbon dioxide and water vapor, corrected by a percentage correction factor k.

are in thousands of B.t.u. per sq. ft. per hr. and average tube wall temperature in deg. F. The solid curves give similar information for complete combustion with 30 per cent excess air and sufficient extraneous moisture admission into the products of combustion to reduce the flame radiating temperatures to those indicated on each curve. These curves are derived from Hot-tel's emissivity data, based on a mean radiating beam length  $L$  equal to 12 ft.

It is interesting to note the increase in the radiant heat transfer rate at fixed tube wall and flame temperatures with and without the use of moisture diluents. For example, referring to the curves in Fig. 7, a transfer rate of 10,000 B.t.u.s per sq. ft. per hr. can be obtained at a tube wall temperature of 1260 deg. F. and a flame temperature of 1800 deg. F. with no moisture diluent, and it is possible to obtain the same rate from the gases diluted with moisture at a temperature of 1600 deg. F. The advantage of moisture as a diluent is, therefore, apparent as the combustion chamber temperature can be held within limits suitable for high tube metal temperatures without sacrificing and in fact increasing the radiant heat transfer rates. The result is an increase in radiation effect due to the higher flame emissivity off setting and exceeding the effect of increased flame temperature. This condition is particularly important in the design of

tubular air heaters and perhaps one that makes such a heater practical.

#### Design of Air Heaters

A hypothetical problem will be used to illustrate the design of a combination radiation and convection type air heater suitable for blast furnace purposes. The cross-sectional view of this heater is shown in Fig. 8. It consists of a tubular air heater for blast furnace air and a waste heat steam generating boiler.

The combustion chamber is at the top, mounted above the convection tube banks and the burners are indicated in the side walls. The tubes directly exposed to radiant heat are those along the roof and side walls of the combustion chamber and the shield tubes just above the convection tubes. The shield tubes are usually regarded to be the first two rows in the convection bank. The main convection banks are placed below the shield tubes and in this case two groups are shown. The convection tubes are closely spaced in staggered arrangement in order to accomplish maximum heat transfer rates.

The flow of air is first through the roof and wall tubes in order to keep them at the lowest possible temperature. Leaving the roof and wall tubes the air is conducted to the bottom of the furnace at the flue gas exit and travels up through the convection tubes in parallel flow leaving the furnace at the two rows of shield tubes. The shield tubes are subjected to the combined direct

radiant heat and secondary radiant heat from the gases passing between them. They also absorb heat because of convection. They must, therefore, be spaced further apart than the main convection tubes in order to prevent overheating resulting from the combination of heat sources mentioned. As the flow of air will be arranged so that the shield tubes will be the last through which the air is passed and, therefore, at the highest metal temperature, these tubes must be made of high heat resisting alloys.

The metals used in all of the tubes must be selected in accordance with the temperature gradient. Those in the hottest zone will be the roof and wall tubes, which are exposed to direct radiant heat. These may be subjected to metal temperatures equal to or exceeding those in the shield tubes and must also be special alloys. Progressively cooler zones prevail in the convection section, and tube materials may be selected according to the lower temperature requirements. For practical purposes, a heater of this type, may be designed and operated so that tube metal temperatures will not exceed the limitations of the chrome-nickel alloys for primary radiant heat absorption and calorized carbon-molybdenum tubes in the convection banks.

The materials for the tubes, tube hangers and supports must be selected to meet the requirements of tensile and creep strength as well as oxidation conditions. The petroleum industry has done considerable research and development work in tube metallurgy, and there are available numerous alloys varying from 1 to 27 per cent chromium content offering satisfactory characteristics for resistance to oxidation, temperature and pressure. These materials are fully capable of meeting air heater requirements.

It will be well to point out that in a heater constructed of expensive metals, certain sacrifices, such as overall furnace efficiency should be made. If it is assumed that blast furnace gas is to be used for fuel, a combination tubular air heater and waste heat steam generator would be an efficient plant. The two units could be arranged in series with the combustion of the fuel in the radiant section of the air heater and flue gases passing to the waste heat boiler at a temperature low enough to keep the air heater surfaces as low as possible and at the same time high enough to provide sufficient residual heat to make

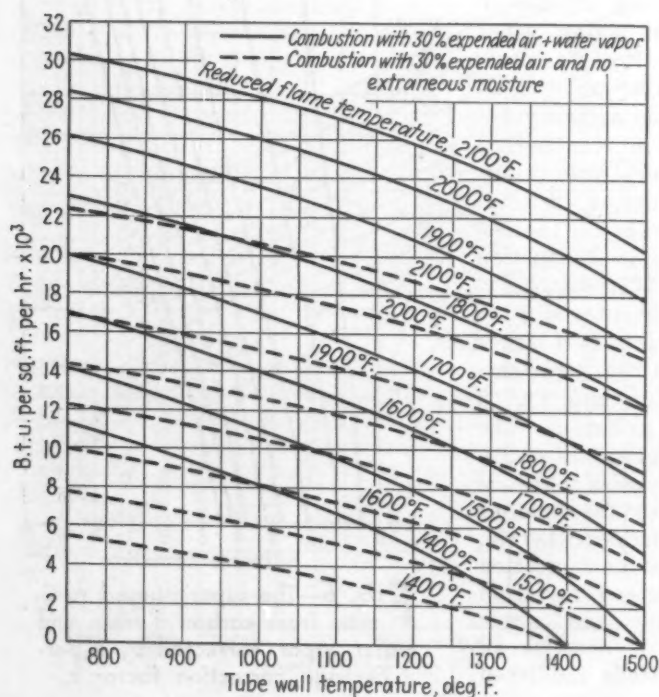
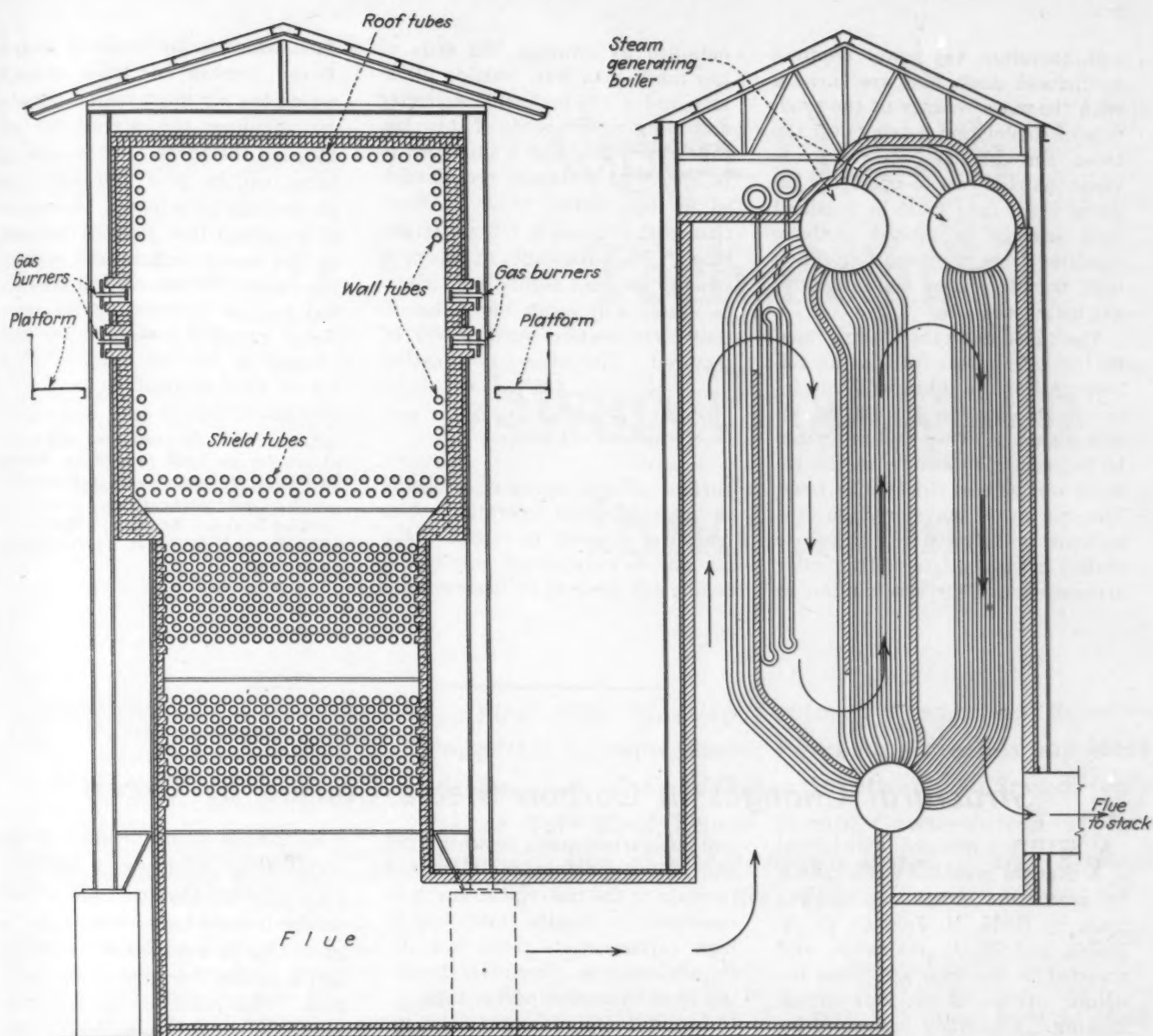


FIG. 7 — The combined radiation effect of the products of combustion when firing blast furnace gas with 30 per cent excess air and flame temperatures reduced in some manner. These radiant heat transfer rates are based on such combustion and a mean radiating beam length of 12 ft.





**FIG. 8**—This sketch shows an air heater combined with a steam generating boiler.

waste heat boiler practical. These conditions can be accomplished by designing the air heater so that sufficient fuel can be burned to meet the air heater requirements and discharge the products of combustion to the waste heat boiler at temperatures between 1000 and 1200 deg. F. It will, therefore, be observed that the air heater alone will be inefficient when compared to the overall efficiency of modern steam generators, but very efficient when combined with a waste heat recovery unit.

#### Tube Size and Spacing

The first consideration in the air heater design is the size of the tubes to be used and their spacing. In any heater of this type it is necessary to conduct the air through the tubes in a number of passes. The passes, however, should be reduced to a minimum in order to

hold the pressure drop within reasonable limits. The pressure required to force the air through must overcome the friction losses in the tubes and return bends, losses due to change in velocity head, and entrance and exit expansion and contraction losses. It is practical and desirable to use the longest tubes adaptable to the design so that reversal of flow and the number of return bends will be held to a minimum.

The tube size should be selected so that the mass velocity of the air through the tubes will not result in

excessive pressure drop and so that turbulent flow will prevail. The latter will reduce the depth of the laminar film adjacent to the inner surfaces of the tubes, and will improve the heat transfer coefficient.

A close tube spacing is advantageous in the radiant section, because the overall size of the combustion chamber can be kept as small as possible and high volumetric heat release can be obtained. The tubes in the convection section should also be spaced as closely as mechanical limitations will permit because the heat transfer coefficient on the outside of the tubes in forced convection is a function of mass velocity of the flue gases. A substantial increase in the heat transfer coefficient can be obtained by a careful consideration of the tube spacing, but the pressure loss through the tube banks must not be overlooked. The pressure drop

and, therefore, the power required by induced draft fans are variable with the mass velocity of the products of combustion passing over the tubes, through flues, etc. It is obvious that the cost of operating induced draft fans must be balanced with savings in tubular surfaces resulting from improved convection heat transfer rates and high flue gas mass velocities.

The tubes and tube spacing used in the calculations will be as follows: All of the tubes will be 6 in. in outside diameter and 5½ in. inside diameter. They will be spaced 10 in., center to center, in the radiant section and shield tube rows. The spacing in the convection tube sections will be 9 in., center to center, in an equilateral triangular arrangement. This spacing can be

obtained by swaging the ends of the tubes to a 5-in. outside diameter and a 4½-in. inside diameter and using return bends of this size, thus permitting the 6 in. tubes to be spaced at distances recommended for 5-in. tubes, which is closer than that obtainable for the larger tubes.\* The advantages of this tube spacing are that higher heat transfer rates will result and substantially less heating surface will be required. Reduction in heating

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*\*Patent 2,169,086 and the subject matter of associated application.*

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surface effects increased economy in materials and operation. The pressure required to circulate the air may be reduced not only by reducing the amount of heating sur-

face, which is the result of using a fewer number of tubes through which the air must travel, but also by dividing the stream of air through the tubes. In this case 40 tubes will be used to conduct the air in parallel streams. Assurance of equalized flow may be obtained by the use of orifices and regulating valves. Stream control is essential because overheating the tubes would result if certain tubes were allowed to become inactive while others were overloaded.

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*Editor's Note: In concluding this series of articles on blast furnace air heating next week, the author takes an illustrative problem and works it out completely, showing in detail the steps of figuring the efficiency and design of tubular heating equipment.*

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## Structural Changes in Carbon Steels Caused by Creep

A STUDY of the structural changes in carbon steels caused by creep and graphitization was made by C. H. M. Jenkins, G. A. Meller, and E. A. Jenkinson, and reported to the Iron and Steel Institute, British, at the 1942 annual meeting. The study was made by means of the microscopical examination of test specimens for short time tensile and long time creep tests. The specimens were tested in a high vacuum over the temperature range of 59 to 1742 deg. F. Usually the stress applied was sufficient to rupture the specimens. The materials tested had various carbon contents up to 1.14 per cent.

While the effect of the carbon content was noticeable in the tensile tests, as the temperature of the tests increased the effect was reduced. In creep tests at 842 deg. F., there was a marked difference in the life of the specimens of certain materials. Those of high carbon content showed the greatest strength. At 1022 deg. F., and above, the effect of carbon in creep tests was not noticeable. The alpha to gamma structural change in iron

and low carbon steels between 1292 and 1652 deg. F. caused a marked increase in the material strength as measured by tensile tests, but in high carbon steels there was little alteration in properties resulting from this structural change.

Generally, the material weakened as the temperature was increased, and structural changes took place. Deformed material gave evidence of slip and dislocation as well as recrystallization, spheroidization, graphitization, and cracking. Depending upon the chemical composition of the materials, these effects showed up in varying degrees. Ferrite deformed by slip action, but the pearlite deformed by dislocation. It appears that the pearlite can be deformed by a shearing action on a plane inclined to the ferrite and carbide lamellae of the pearlite.

As the tests were made principally on high carbon steels, recrystallization of the ferrite was not prominent. Because of the higher proportion of pearlite in the high carbon steels, spheroidization was important. In some cases, spheroidization occurred in the short

time tensile tests because of the accelerating influence of deformation. Spheroidization may occur locally in a test specimen, and this gave rise to appreciable softening and a sudden fracture of the specimen. The reduction of area was relatively high, considering the degree of elongation in these cases.

Graphitization, which needs a longer time than spheroidization to appear was also common in high carbon steels, particularly below the A<sub>1</sub>-A<sub>3</sub> critical range. Graphite formation was found in highly deformed material near the fracture in creep tests at a temperature as low as 842 deg. F. The graphitic areas so formed acted as centers of weakness at which cracks developed in stressed specimens. Graphitization was less frequent above the A<sub>1</sub>-A<sub>3</sub> range than below it, occurring only in steels of the highest carbon content. It appeared to aid the development of intercrystalline cracking, which was observed above the critical range. Rapidly graphitizing steels, generally, offer poor resistance to creep and will spheroidize rapidly.



# Open Hearth Technicians Swap Production Innovations

CONTRARY to all pre-war estimates, the American steel industry has maintained constant operation on schedules above 95 per cent of capacity. Only the sloughing off of many casual and careless practices, and ingenious adaptation of equipment and techniques to absorb shifting and deterioration of raw materials, have permitted maintenance of this startling pace. The shock troops of this entire action—some 600 of them—gathered last week in Cincinnati for the Twenty-Fifth Conference of the Open Hearth and Blast Furnace and Raw Materials Committees of the Iron and Steel Section of the American Institute of Mining and Metallurgical Engineers. There all the new tricks in furnace construction, instrumentation and operation, procedures in handling poorer grades of scrap, techniques made necessary by higher and higher hot metal charges, and all the multitude of other tricks of the trade to turn out quality raw steel in increasing volume, were wrestled around and picked apart. There can be little doubt but what at least a couple points in the national operating rate from now on can be attributed to the data precipitated at the meeting.

After short introductory remarks by General Chairman L. F. Reinartz, the basic open hearth group immediately shifted into a discussion of refractories practices to

**... First War Meeting Features Production Boosts—  
Monolithic Bottoms, Better Patching Materials and Methods, Spectroscope and Other Instruments to Speed Heats, Use of Soft Ore, Tinned Scrap, Conservation of Raw Materials, Use of Sinter, Blown Metal, Duplex Process, Etc., Etc.**

withstand the pushing of today's campaigns, that permit quick repairs, and lend themselves to rapid rebuilds.

Quite obviously the use of rammed bottoms in American furnaces is showing up so well that the next couple of years will witness a virtually complete shifting away from older methods of bottom construction. Monolithic bottoms were shown to result in far less delay in repair, have a much faster rebuild, and a longer useful life, and can easily lift average output by 3 per cent or more. A Canadian reported on a rammed bottom on a 200 ton furnace, with 500 heats already off the bottom and with it still in good shape. Delays were said not to average over 10 min., and the total time in rebuild up to putting the oil on was 50 hr. Republic's Warren plant has just put in a rammed bottom, with oil going on in 20 hr. after which dolomite was burned in. About 10 in. of Ramix was first laid down, then covered with 6 in. of sintered magnesite. On another furnace, 10 in. of

Ramix was tried on one end and 6 in. of KN on the other, and to date both have stood up about equally well. Other operators reported similar results on both Ramix and KN, although there were sizable variations in thickness of materials used and thicknesses of sintered overlays.

The entire subject was pretty well sized up by H. N. Barrett, Jr., of Basic Refractories, Inc., who dealt with the magnesitic ramming mixtures, Ramix and Ramix 82, in basic electric and basic open hearth furnaces.

Mr. Barrett pointed out that Ramix hearths of varying thickness up to 18 in. have been installed in more than 50 open hearths in the past two years. He recommended a thickness of not less than 6 in. and believed there are definite advantages in heavier hearths. In most instances the permanent Ramix bottom is surfaced with a working hearth of burned in granular refractory. This replenishable hearth could be a grain magnesite refractory, but from the standpoint

of economy and speed, and desirable chemical and mineralogical composition, a magnefer type of material or similar dead burned dolomite would seem to be the logical choice. Recent tendency has been to increase the thickness of the rammed portion of the hearth and to decrease the depth of the "burned in working hearth." Some operators consider this trend so logical that they have completely eliminated the fused portion of the hearth and now make steel directly on the Ramix hearth.

Ramix and Ramix 82 are made from stable magnesia clinkers; the clinker used in the former contains approximately 65 per cent magnesia, and in the latter it runs between 80 and 82 per cent of magnesia. The clinkers are sized accurately, and a series of chemical bonds are used to give a strong "air set" to the refractory when it has been mixed with water to the consistency of a molding sand, and are so selected as to maintain an adequate strength in the rammed structure until enough heat has been applied to develop a high temperature or "ceramic bond."

*Ramix 82 has been accepted by electric furnace people as a high type of refractory, but so far open hearth men have used it very little. However, Carnegie-Illinois reported trying both types in the open hearth, and has found little difference in their performance.*

After considerable experimentation over the past several years, a method has been devised in building up a Ramix bottom in which wooden forms are used to shape the banks. This method of ramming the banks has speeded the installation, removes the most arduous part of the job from the standpoint of the men operating the hammers, insures a bank of uniform, predetermined dimensions, and yields a far denser, stronger structure since the refractory is rammed in a closely confined area.

#### Bottom Repair Cut 50 Per Cent

From monolithic bottoms, the discussion shifted to repair of bottoms, with attention centered mostly in the proprietary material StaSet. Youngstown reported use of StaSet has cut down bottom delays by 50 per cent; Republic reported its use in holes 6 in. to 8 in. deep; and Armco's Ashland plant stated that StaSet Special C had been used in very large holes requiring some 3000 lb., the time involved being on the order of 2 hr.

Dolomite is used as the source of magnesia for the production of the artificial magnesite, StaSet. The magnesia in dolomite is concentrated by removing the accompanying lime. Ferric oxide is added and the mixture is roasted in a rotary kiln. StaSet contains 70 per cent magnesia and 4 per cent silica. A higher silicon content in StaSet has not been found necessary either by laboratory test or by practical tests made in furnaces, according to I. A. Nichols, of the Standard Lime & Stone Co., Pittsburgh. The possibility of magnesium or calcium silicate forming a solid solution with iron silicate is reduced to a minimum. StaSet can be "burned in" at normal operating temperatures without the use of an auxiliary flux.

StaSet Special C is a mixture of regular StaSet and chrome ore, specially sized in order to make a dense mixture and promote a quick reaction between its component oxides. The use of this material differs from magnesite in that a deep bottom or bank hole can be patched in one application. It is not necessary to add an inch or two of material at a time followed by a "burning in" period of 1 to 4 hr. Thus a bottom repair can be made in from one-fourth to one-half of the time that is required by the quickest setting magnesite. The method of making a bottom repair with this special StaSet is a very simple matter. The hole in the bottom is filled with slag and metal, which should be removed as completely and quickly as possible by any convenient method. The depression is then filled by adding special StaSet in shovelfuls thrown through the doors of the furnace, except the last portions, which may be added from a spoon, pushed through the door so as to smooth up the work and bring the top surface of the patch flush with the top surface of the bottom. As the material tends to shrink, causing the surface to sink slightly, a layer from 1 to 3 in. thick of roasted dolomite or magnesite is added as a top dressing over the patched area. This dressing also prevents liquid slag flowing from the banks and other parts of the furnace from reaching the filling before it has been heated to a setting temperature. Heat is then applied and the temperature of the patched area brought up to about 2900 deg. F. and held there from approximately 1 hr., after which period the furnace may be charged.

Mr. Nicholas, in his discussion of StaSet and furnace bottoms in general, gave some very interesting data on tests made on new and old furnace bottoms. The magnesia in a furnace bottom starts at 70 per cent and as the campaign progresses it drops to 20 per cent, the iron oxide jumps up to about 50 per cent, the silica is lowered by one-half, the lime is more than doubled and exists in about molecular proportion with magnesia. The composition of an old bottom resembles somewhat a basic slag and differs mainly in the silica and magnesia content. The bottom is more refractory than a basic slag because the silica is lower and the magnesia higher. Such a bottom can be virtually melted at the tapping temperature of certain grades of steel. Not infrequently several inches will melt away or slough off while a difficult low metalloid heat is being made, and a resurfacing is necessary before the next heat is charged in order to build up the bottom to its former level. An old open hearth bottom can survive only because the loss of heat through radiation from the bottom is greater than the input from contact with the molten metal.

An old bottom is relatively unstable, and its refractoriness depends mainly on a magnesia content of only about 20 per cent. Therefore, it would seem to be an economy to enrich regularly the magnesia content of an old bottom by resurfacing. This is standard practice in shops that operate tilting furnaces. In this operation it is necessary to resurface regularly on account of the continuously high temperatures to which bottoms are subjected in making duplex steel. A resurfacing job with a quick-setting magnesite can be made in a relatively short time, and if this practice effects a saving by decreasing bottom boils and delays in the operation of a tilting furnace, the same practice should also effect an economy in the operation of a stationary furnace.

As a patching material, StaSet is so made up as to conform to the demands that will be made on it. This is shown in Table I, which gives the composition of StaSet and of an old furnace bottom.

The attention of the conference next shifted to chrome ore in general, and the plasticity of chrome ores in particular for patching efficiency. Plasticity is the property



which when properly possessed by moist chrome ore ready for application gives the open hearth man the most successful start in his use of ground chrome or mixtures. It enables the material to be molded without rupture into any desired form, which is retained after the pressure of molding has been removed.

According to F. L. Toy, of the Munhall plant of Carnegie-Illinois, finer grinding will assist greatly in getting plasticity but in addition it may be necessary to add a plasticizer such as shale or other inorganic or organic material for adding the property of plasticity. The fineness of grinding in order to make use of lower grade chrome ores and to obtain more economical use of any chrome ores, now that the serious curtailment of chrome ore supply makes such procedure imperative, becomes a matter of experience which must be accumulated quickly in order to meet the problem of getting the most effective use of available chrome ores and with the greatest possible economy. In general a fineness of through eight mesh or finer is required.

Another reason for finer and more uniform grinds is important because of the necessity of distributing more uniformly the gangue material of lower than standard chrome ores and of making possible the thorough mixing with the ground chrome ore of ground magnesite in order to form chrome magnesium silicates (Fosterite) so as to prevent as much as possible shrinkage and instability at high temperatures.

For example, California chrome ore as received contains a large amount of poorly distributed impurities such as serpentines which cause excessive shrinkage and instability at high temperatures. A relatively stable chrome-Fosterite refractory can be obtained from this ore by the addition of 10 per cent of Washington magnesite and this mix should be satisfactory for open hearth use. The plasticity of the California ore is somewhat better than that of the Philippine chrome ore, and if the necessary magnesite addition is finely ground the resulting plasticity may be sufficient for proper workability. Any shale additions for further increase in plasticity must be accomplished by additions of magnesite.

The grinding of chrome ore which the open hearth operator has done

TABLE I  
Analysis of StaSet and Old Open  
Hearth Bottom

	StaSet	Old Open Hearth Bottom
Silica	4.0	3.79
Total iron as iron oxide	10.0	49.84
Alumina	2.0	
Lime	14.0	22.94
Magnesia	70.0	19.37

for himself in the past is in the majority of cases not fine enough to obtain plasticity, now rendered more than ever necessary, and particularly important now that replacement in part by inferior grades of chrome ore brings in the problem of more gangue material present and the necessity of finely distributing it so he can get an intimate association with the ground magnesite he must use to stabilize the silicates and to increase the refractory properties.

With sufficient plasticity and stabilization of silicates accomplished he still has the problem of getting the chrome ore layer to stick together long enough to give it a chance to frit together or sinter, particularly on the surface layers. Otherwise, the most refractory chrome ore mixture simply dries and sloughs off grain by grain and chunk by chunk so that a large part of the patch falls away from the part of the furnace structure he wishes to protect. The result is that he wastes chrome ore out of all proportion to the time and labor and material he should have spent in obtaining a mixture that would maintain itself in proper position. To accomplish this good purpose he must use binders and such may vary over the range from inorganic or organic powders, glutrins on through to the various kinds of pitch either liquid or finely ground and associated intimately in the mixture.

Experience in the past has indicated that a balanced chrome ore mixture, sufficiently fine and having a proper binder which will coke and hold the chrome ore together long enough to let it sinter, as purchased from one refractory company has easily paid for its extra cost over chrome ores prepared for use in some open hearth plants.

As regards a practical test, how can an open hearth man judge the quality of his ground chrome ore ready for application? Such ores as the Cuban chrome ore have

been used with relative success and may be sufficiently refractory in laboratory tests, but to maintain them finally in place in the part of the furnace which is to be patched, requires the maximum insurance against popping or breaking up in separate chunks. Here the use of ground magnesite makes a great improvement in permanence and in economy in consumption. The popping test as conducted in the laboratory consists in dropping small balls of chrome ore mixtures in a small furnace maintained at approximately 2500 deg. F. The open hearth man in order to check his purchased ground chrome ore or that which he has prepared in his own plant may place a brick on the open hearth bank and lay thereon a spoonful of the chrome ore mixture equivalent to about half the volume of a baseball. Observation of the popping effect whereby the lump breaks up into pieces can be observed through the furnace door wicket hole. The sintering qualities of the chrome can best be observed by watching its action when used as a patch on furnace door jambs.

There are operators who show successful substitution of Olivine for a part of the chrome ore, carrying magnesite also in the mixture. Since there are possibilities in the use of chrome ore, Olivine, magnesite mixtures in certain parts of the furnace, it was recommended by Mr. Toy that the ceramic engineers of the steel industry institute some real comparative tests.

#### Spectrograph Use Growing

In the afternoon session of the committee, considerable interest was displayed in instrumentation to speed analytical work, such as the spectrograph, photometer, Leco machine for sulphur and carbon determinations, etc. Carnegie-Illinois reported the use of a spectrograph in the development stage at Gary, and stated intention to use one at Homestead. The most practical information came from Weirton, however, which has had a spectrograph in plant use for some time.

Weirton reported that one of the causes of time lost and delay in tapping was the tedious and long "wet method" for determining copper and tin. Inasmuch as Weirton is a large user of scrap, the copper and tin varies considerably from heat to heat. Prior to the spectrograph installation, copper preliminaries were taken 3 to 5 hr.

before tapping time, thus giving the laboratory sufficient time to analyze for this element and report to the open hearth. Due to the necessity of taking this test so long before tap, there was quite often a large variation between preliminary and ladle test. Normally this variation would require this heat to be diverted into some other order. At times the order into which the heat had been diverted would necessitate rolling large ingots into small billets or slabs, thus causing considerable delay and excess costs to the blooming mill.

The tin preliminaries were taken 1 to 1½ hr. before tapping time or when the carbon, phosphorus, etc., were worked out sufficiently to make the tin determination accurately. Occasionally the results were not obtained until almost tapping time and then found to be out of specification, necessitating change of molds and reordering another heat. Whenever it was necessary to change molds, the heat was held in the furnace ½ to ¾ hr., thus causing this amount of delay in tapping.

Chromium and nickel by the "wet methods" require considerable time and laboratory space. These are required on very few specifications.

With specifications imposed on these contaminants, it is highly desirable to have the analysis as long before tapping as possible in order to divert any heat that is out of specification.

The development of the spectrograph in the past few years gave indications that some of these elements which have been time wasters in the past, might be brought under control by use of this instrument. Accordingly the Weirton Co. decided to purchase a spectrograph. After this decision was made the next matter of importance to be considered was the type of instrument to be installed, which was best suited to the needs of the steel plant. After lengthy consideration, visits to laboratories where spectrographs were installed and consultations with experts in the field, a grating type instrument, made by the Dietert Co., was installed. This equipment is of rugged construction and seems well adapted to 24 hr. per day, 365 days per year service. The space which was available was a room 12 x 30 ft. This room is divided into three sections, one for the densitometer, another for the dark room to develop films, and the third room for light

sources (spark and arc), bracketing machine, grinding wheels, etc.

The spectrograph was installed in the chemical laboratory and standardization began on July 7, 1941. By Aug. 25, standardization had progressed to the extent that copper was being reported as a routine analysis on both preliminaries and heats. By Sept. 10, the tin determination had been added and shortly afterward chromium was included.

By spectrographic means one set of pin tests is taken 1 to 1¼ hr. before tapping time; and copper, tin and chromium contents are reported to the open hearth and the blooming mill in 25 to 30 min. Time required for ladle analysis on these elements is of the same order. The pin tests are made in a special mold with two 7/32-in. holes in the bottom. The steel is thoroughly killed with virgin aluminum before pouring the test.

Standardization work is continuing on nickel, manganese, silicon, molybdenum and aluminum and it is hoped that some of this group may shortly be added to the others. The spectrograph has been found to eliminate all the lost time at the open hearth and blooming mill, due to the speed and accuracy of the results obtained, as compared to the longer and more tedious previous methods. It was also stated that, other than the time saved, this equipment has paid its way in qualitative and quantitative analysis on many other samples.

Although Weirton uses a grating type instrument, a Bausch & Lomb representative stated that a competitive instrument made by his company—a quartz prism—should give better dispersion in the ultra-violet region where most of the analytical work is done. Bethlehem reported the use of two instruments, both of the prism type, one being used for about two years now at Lackawanna to analyze for incidental elements to an accuracy of about 2 per cent of total element present. The other instrument is a special one made by the University of Michigan and is mostly for laboratory work. It was pointed out by Bethlehem that present commercial light sources are not completely satisfactory and they have had to develop some special equipment of this type. In general, Bethlehem considers spectroscopic control just as good as routine chemical tests, but it is not accurate enough for controlling

quality of special steels such as tool alloys.

As regards use of a Photometer, there is so little experience available that not much can be stated as regards its efficiency other than it looks promising. The Photometer is one version of the photoelectric calorimeter, and it measures in a quantitative fashion any element that can be put into solution. This wet method is a substitute for the old comparison camera.

The situation of the Leco machine is much the same as of the Photometer. Certain aspects appear promising, but there is as yet little experience on which to base definite conclusions. The instrument has been modified several times, and at Wisconsin Steel it has speeded determinations of C, Mn, P and S.

#### Tinned Scrap, Conservation

From instrumentation, the group swung over into use of tinned scrap and the conservation of materials such as manganese and aluminum. What with the pressure on scrap supplies, several steel companies have within recent months shoved tin plate scrap into their furnaces, i.e., bundled used tin cans. A Canadian mill reported that on high sulphur and low carbon heats it had used as much as 50 per cent of the charge of incinerator bundles. No difficulty was experienced. Present practice is to use tinned scrap for 20 per cent of the charge. Weirton also mentioned use of tinned scrap. The general attitude of the Committee, however, was one of extreme caution. Whereas tinned scrap could be used sometimes with no serious kick-backs, many operators were of the opinion that its constant use would lead to plenty of trouble. Its use could contaminate bottoms, and to at least one operator it would always be just a damned impurity no matter how long its use was discussed. Some men reported a 0.2 per cent or more tin residual after the use of incinerator bundles, and several pointed out that a high tin residual in combination with a high copper residual would be pretty murderous. It also was generally concluded that the effect of tin would be increasingly deleterious as the carbon increased, and would have a very serious effect on cold ductility of all steels. Incinerator bundles should never be used in steels requiring cold draw-



ing or modified cold work such as experienced in rails, etc.

As regards conservation of aluminum, F. C. Swartz of Youngstown, reported that on all their aluminum semi-killed orders, except a few which require extra good surface, the practice has been changed to help conserve aluminum as well as get better yield in the blooming mills. In the A-6 grade, that is aluminum-killed 0.12 to 0.29 carbon steel, the aluminum addition in the ladle has been cut from 90 lb. to 50 lb. and the aim on the ladle silicon was increased from 0.040 to 0.070 to make up for this decrease in aluminum. By this practice, the aluminum necessary in the molds was decreased and more uniform deoxidation in the molds was secured as well. The net saving in aluminum is from 40 lb. to 50 lb. per heat. This change in practice showed an 8.5 per cent increase in overall yield with a slight increase in preparation cost of 16c. per ton ingots. On the B-6 grade, that is aluminum semi-killed 0.30 to 0.55 carbon steel, the aluminum addition in the ladle was cut from 50 lb. to 30 lb. and the aim on the ladle silicon was increased from 0.030 to 0.070. This practice resulted in an aluminum saving of from 20 lb. to 30 lb. per heat.

On all 0.10 to 0.30 carbon fine grain steel, the aluminum addition in the ladle has been cut approximately in half (under 0.20 C, cut from 300 lb. to 140 lb., and on 0.20 to 0.30 C, cut from 235 lb. to 110 lb.) and  $\frac{3}{4}$  lb. aluminum per ton is added in the molds on under 0.20 carbon heats and  $\frac{1}{2}$  lb. aluminum per ton steel is added on 0.20 to 0.30 heats. This results in a saving of 45 to 55 lb. aluminum per heat as well as more uniform and higher aluminum analysis in the finished steel resulting from this practice also. The preparation costs of steel made with the above practice, based on 12 heats made with the new practice, was slightly better than the old practice.

As regards use of Rasorite to replace aluminum, Youngstown reported on a thorough study of 63 Rasorite heats versus 137 regular aluminum heats. It was found that Rasorite can be substituted for aluminum addition in the ladle on open pour steels, 0.10 carbon and under, without sacrificing quality and with a saving of approximately 2.5 oz. aluminum per ton ingots and a net saving of 1c. per ton ingots. Other mills also reported successful application of



• • • The Bessemer converter is again coming into its own. New control equipment and scarcity of scrap are two factors contributing to the revival of this rapid and flexible steel making procedure.

Rasorite to cut down their aluminum requirements.

#### Use More Soft Ore

In view of the growing difficulties in securing enough hard ore for open hearth use, the American Iron and Steel Institute has investigated the use of fine (or soft) Lake ores in the charging of open hearth furnaces. C. H. Herty, Jr., gave a brief report of the conclusions arrived at.

Mr. Herty stated that the amount of soft ore which can be used is determined by the ignition

loss, the silica content, or the degree of fineness.

That as a general statement an ore with less than 3 per cent ignition loss and less than 7 per cent silica can be used alone up to about 61 per cent hot metal, with occasional instances of 65 per cent hot metal being successfully used with such an analysis ore. With this analysis ore the pounds of ore per ton of product will be from 200 to 270 lb. with a maximum of 320 lb. of ore reported. Above 5 per cent ignition loss, the per cent hot metal which can be used with

soft ore alone is about 55 per cent with occasional special cases using more than this average in hot metal. The pounds of ore per ton for this type of ore will be in the neighborhood of 130 lb. per ton.

On high hot metal charges up to 70 per cent metal, it has been found that a combination of soft ore with sinter or hard ore gives a satisfactory result. From data available it can be generally calculated that with high hot metal charges at least half of the ore charged can be soft ore provided that the soft ore is reasonably low in ignition loss and silica.

In the results obtained by the committee, furnaces from 90 to 200 tons were included and thus a wide variety of hearth areas and bath depths were reported, and ten different soft ores were involved in the work. On account of the number of the variables such as bath depth, hearth area, type of steel being made, type of fuel used, etc., it has been impossible at this time to determine quantitatively the exact relation between ore characteristics and amount which can be used. However, the major variables appear to be ignition loss and silica, and as an approximation for the average condition, to which there will always be exceptions, it can be stated that the apparent limiting conditions are:

(a) for ignition loss (combined water) the limiting amount is about 7 lb. of combined water in the ore per ton of product, and (b) the limiting condition for silica is about 15 lb. of silica per ton of product. Thus in determining the amount of ore which can be used, it would be only necessary to have the analysis for ignition loss and silica, and from the two limiting amounts above, calculate the pounds of ore per ton of product which would limit the use of the particular ore.

In view of the urgency for maximum output of steel, the data desired were to be expressed in terms of ore usage which would in no way interfere with production rates or quality. All the figures given by Dr. Herty are based on that premise, i.e., the amounts of soft ore which can be used are those which affect neither production nor quality.

#### Use of Blown Metal

As the discussion shifted to the use of blown metal, considerable interest was displayed in the experiences of Weirton Steel Co., as

developed by J. D. Gold, chief metallurgist, and S. M. Newbrender, assistant.

Early in 1937 the Weirton Steel Co. had an excess of hot metal over the amount required to charge its 12 basic open hearth furnaces—this on the basis of straight “scrap-hot metal” heats. After due consideration, it was decided to use this excess hot metal by first converting it to “synthetic scrap” and charging into the open hearths in a molten state. By “synthetic scrap” is meant basis iron which has been blown to about 1 per cent carbon. There was already available ample blast furnace blowing equipment which could be used in operating a converter. Fortunately, there was a natural setup, for there was sufficient space between No. 1 open hearth and the south end of the mixer building to permit of a converter installation.

Therefore a relatively small expenditure was all that was needed to complete the facilities already at hand, enabling Weirton Steel to consume its excess of hot metal by this process. It was well known that other companies were blowing iron and pouring into ingots, these ingots later being charged cold as “synthetic scrap.” There was every reason, therefore, to believe a method could be developed, whereby blown metal could be charged molten in combination with cold scrap; the charge then being worked in such a manner as to produce steel of a quality equal to that of the orthodox scrap-hot metal charge. Charging in molten form would have the added advantages of cheaper practice, more rapid and efficient handling, and the conservation of heat.

A 25-ton converter was installed, with its attendant equipment for making and changing bottoms, slag handling, etc. Facilities were also provided for conveniently charging scrap so that cooling of the blow could be effected by the use of scrap, in addition to the use of steam. The first converter was started in June 1937, and thereafter was used only intermittently, depending upon trade conditions. Although the tonnage produced by this method was limited, it was proved that the quality of the product could be made equal in every respect to the steel made by the customary scrap-hot metal process. As time went on, experimentation made possible the production of a high quality open hearth steel by this process, suit-

able for auto body sheets, strip steel and tin plate.

With the growing scarcity of scrap, and consequent increase in price, and with the higher content of alloy contamination from such scrap as could be obtained, it was evident that the use of more virgin hot metal would be a distinct economic and quality advantage for the production of steel. Accordingly, a third blast furnace was blown in December 1941, and a second 25-ton converter was built at the north end of the mixer. This converter was started in February 1942.

The open hearth shop is comprised of 12 stationary basic furnaces ranging in capacity from 200 to 400 net tons. The normal scrap-hot metal charge consists of approximately 40 per cent hot metal and 60 per cent scrap, with about 8 per cent limestone. With the use of the two converters this scrap-hot metal practice is replaced with about 50 per cent of the tonnage being made from blown metal heats, these being charged with approximately 70 to 80 per cent blown metal, 20 to 30 per cent miscellaneous scrap and 5 per cent limestone. The metal is blown to about 1.00 to 1.29 per cent carbon. This proportion of blown metal, with the carbon content stated, was found to give the maximum tonnage consistent with good quality. This was definitely developed after numerous experiments with various percentages of blown metal of various carbon contents.

In making these heats the limestone is charged first. This is followed immediately with the miscellaneous scrap. The molten blown metal is then added as soon as it can be delivered from the converters.

Iron for blowing is obtained from the three blast furnaces, all producing basic iron. The iron ranges in analysis as follows:

Carbon	.....	4.00	-4.40
Manganese	.....	1.00	-1.25
Sulphur	.....	0.035	max.
Phosphorus	.....	0.300	-0.340
Silicon	.....	1.00	-1.20

When a converter is ready for charging, scrap is added first, the amount varying with prevailing conditions. On top of this is poured about 65,000 lb. of iron from the mixer. For charging scrap, a series of open end scoops mounted on a car and dumped by means of a vertical, pneumatic ram, is used. Each scoop holds



about 3000 lb. of scrap. The scrap car is moved by the electric transfer which also switches the hot metal ladle from the mixer to the converters. This one transfer shuttles between both converters, which are equidistant from the ends of, and in line with the mixer. It was pointed out that only one converter is under blast at one time. That is, one is blowing while the other is pouring and being charged.

The charging having been completed, the converter is righted for blowing under a blast pressure of about 25 lb. per sq. in., with a blast volume of about 30,000 cu. ft. per min. The converter bottoms are made up by using 31 ten-hole tuyeres, holes being  $\frac{1}{2}$  in in diameter. The tuyeres are 34 in. long.

The time for blowing varies with conditions, but averages about 12 min. The resulting blown metal has approximately the following analysis:

Carbon	.....1.00 -1.25
Manganese	.....0.15 -0.25
Silicon	.....0.020-0.050

Two of these blows are poured into one ladle, and after being placed on a transfer car, is taken to the scheduled furnace, into which it is poured in the conventional manner.

The charge in the open hearth having been completed, the heat is worked in the usual manner of a scrap-hot metal heat. It should be emphasized that by this practice, the usual vigorous lime boil is experienced quite the same as in the working of scrap-hot metal heats using limestone. Furthermore, the physical characteristics of the slag formed are similar to the slags of conventional open hearth practice. When the proper finishing condition has been achieved, the heat is ready to tap. These heats have a residual of about 0.10 to 0.12 manganese, which is practically the same as the residual of the scrap-hot metal heats.

Due to the variation in furnace size, savings in time vary from about 40 per cent on the small furnaces to approximately 50 per cent on the larger units. This saving in time is due largely to more rapid charging, faster melting and lower slag volume.

Weirton has found rimmed heats made by this blown metal process, rim comparable in every respect to the customary scrap-hot metal heats. The ingots bloom well and



• • • Limestone, ore and carefully selected steel scrap are first charged in the open hearth, an operation taking from  $1\frac{1}{2}$  to 2 hr. The molten pig iron, shown here, is added about 4 hr. later after the scrap has melted. Additions are made from a 100-ton hot metal ladle, as shown in this Carnegie-Illinois plant. Each heat contains approximately 150 tons, representing about 92 per cent of the material charged.

the semi-finished products do not require an excessive amount of shipping. Ingots broken show a structure equal in every respect to the conventional open hearth output.

In summation, the process was stated to have the following advantages:

(1) A flexible process for using high iron and low scrap, the ne-

cessity for which is caused by changing trade condition.

(2) Better control of alloy contamination.

(3) Increased output per furnace.

(4) No sacrifice in quality.

#### Duplex Process Examined

In the United States the term "duplex" refers, almost without

exception, to the metallurgical technique which combines partial refining of pig iron in the acid Bessemer converter with final processing in the basic open hearth furnace. During the past few years appreciable tonnages of blown metal, either cast into ingot form (synthetic scrap) or handled liquid (molten scrap), have been charged into basic open hearth furnaces as a substitute for some portion of the scrap customarily used. These applications may properly be considered as modifications of the normal open hearth process. In the duplex method the major portion of the metallic charge consists of Bessemer blown metal transferred in the molten condition to the open hearth furnace, with the proportion of pig iron limited to that amount required to properly refine the heat. A paper by H. B. Emerick and S. Feigenbaum, of Jones & Laughlin Steel Corp., dealt in considerable detail with the metallurgy of such a duplex operation. In summation the authors pointed out that:

(1) The development of the duplex process has accurately re-

flected certain economic conditions, particularly the supply and market price of melting scrap.

(2) The tilting furnace ordinarily used in duplex operation has specific metallurgical advantages in that slag may be flushed at will, and good tapping practice is assured. Fuel cost per ton in duplexing is approximately half the usual cost in conventional practice.

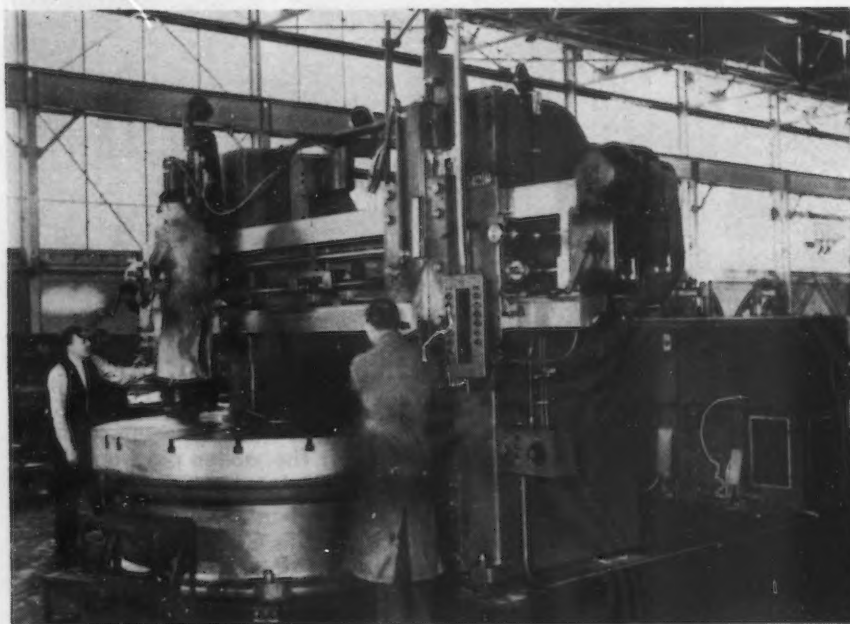
(3) A typical analysis range was given in the report for blast furnace iron suitable for duplex operation. Production of blown metal for duplexing is accomplished successfully with the application of methods which have been developed for control of Bessemer steel quality. Data also were presented to show that heat time is directly related to carbon content at fillup.

(4) An evaluation of the duplex method from the viewpoint of process metallurgy indicates certain definite advantages over other open hearth processes. Duplex heats contain minimum amounts of undesirable residual alloys. Due

to the low silica content, low slag volume and high fluidity are characteristic of this process and carbon elimination and refining are relatively rapid. The relatively higher degree of oxidation of the bath in duplex operation is advantageous in the production of rimming steels. Production of quality killed steels is readily accomplished by the application of suitable deoxidation practices.

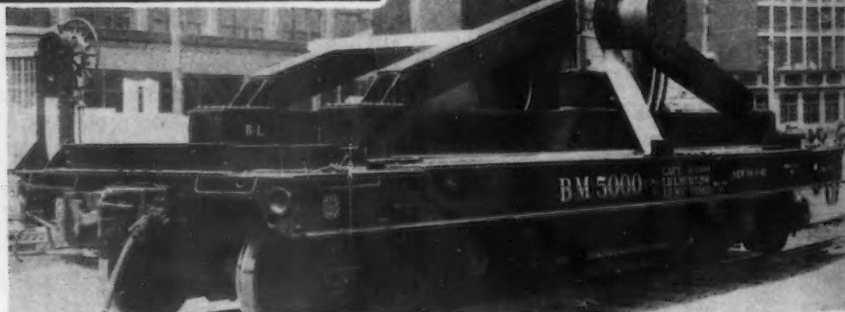
(5) Nitrogen content of steel is known to be related to strain-embrittlement, reaction to cold work and aging characteristics. Controlled nitrogen content is desirable for various applications. In duplex operation, nitrogen control may be attained through (a) temperature control of the blown metal charge, (b) control of the fillup carbon and subsequent rate of carbon elimination in the open hearth furnace.

From the standpoint of flexibility, it would seem that in the construction of any new integrated steelmaking facilities definite advantages would result from the inclusion of a reasonable proportion of duplexing capacity.



ABOVE

**F**ACTORY WEAPONS: Fisher Body Co. is producing vertical boring mills to make tanks. Both 100 and 112-in. mills are being made on government orders, and a contract for the construction of 48 and 72-in. planers started last summer, was recently completed.



BELOW

**C**ARS FIT THE JOB: A special type, well car recently made for General Electric to ship large gears for marine propulsion sets, features an adjustable superstructure, which can be adjusted lengthwise at 2 1/4 in. intervals to accommodate gears of various dimensions. Eight of these cars were built by Boston and Maine Railroad for G.E.

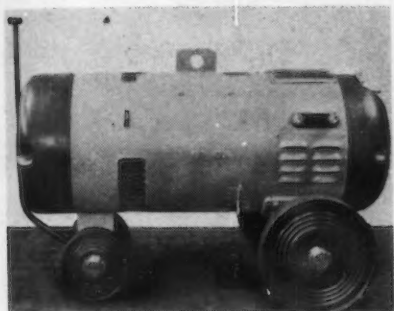


# New Equipment . . .

## Welding Apparatus

Four new arc welders, three new carrying devices and a transformer type a.c. welder are highlighted in this week's news, along with new electrodes and other accessories.

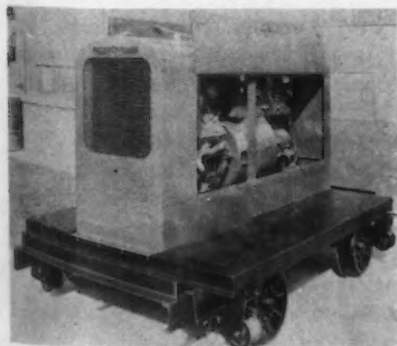
**T**HE new portable Flexarc welder announced by *Westinghouse Electric & Mfg. Co.*, East Pittsburgh, is rated at 200, 300 and 400 amp. for 220, 440 and 550 volt a.c. circuits; 2 and 3



phase, 25, 50 and 60 cycles. A ball crank adjustment permits pre-setting of current before welding. Steady current regardless of arc length is provided by arc control which can be adjusted to suit the welding job. This design requires no field rheostat or external reactor. A dual voltage control on the starter makes it possible to change operation from 220 to 440 volts without changing the contactor coil.

### Railroad Arc Welder

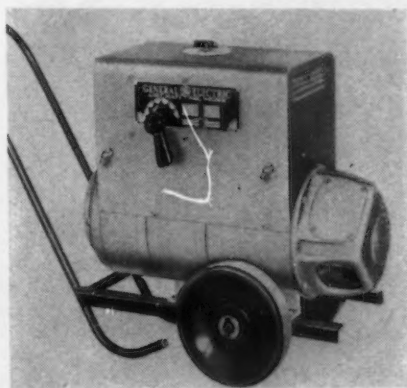
**G**ENERAL ELECTRIC engine-driven arc welding equipment is mounted for rail transportation on a unit built recently by the Machinery & Welder Corp. for the Missouri Pacific Lines, St. Louis.



Its standard gage railroad wheels are insulated to prevent the car from throwing signals as it moves from one block to the next, and it has a mechanism to permit its removal from the track when trains approach. The arc welder itself is a standard G-E 300-amp. gasoline driven unit with a 2-kw. 220-volt, 3-wire auxiliary generator connected at one end. It is mounted on an all welded steel platform which has a 20-in. catwalk for carrying men and tools.

### Thin Gage Welder

**A** NEW 150-amp. d.c. welder, the Strikeasy, has been announced by the *General Electric Co.*, for use in fabricating bright-surfaced, thin



gage metals such as aircraft tubing with a wall thickness of 35 mils. An important feature is its high instantaneous recovery of voltage which helps the operator strike the arc with ease under the difficulties presented by thin metals having a bright, polished surface. Rapid and accurate adjustment of the welding current is provided by means of a tap switch and a rheostat. A remote control device permits the operator to reduce the current when it is necessary to fill a crater or when a reduction of heat is needed to prevent burn-through. It handles shielded arc electrodes from 3/64 to 3/16 in. in diameter.

### Improved Welder Control

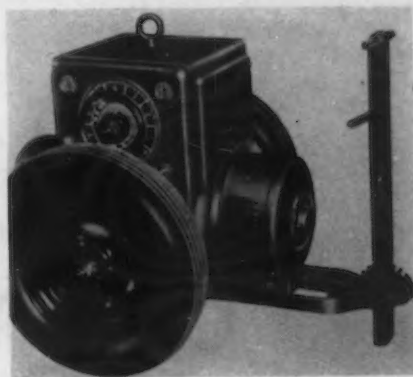
**R**EDESIGN of the dual continuous control on the arc welders built by the *Lincoln Electric Co.*, Cleveland, has eliminated the need



for meters showing volts and amperes on these units. In addition to simplifying operation by eliminating the necessity of meter reading, the new development provides for positive reversal of polarity. Since voltage control and current control are continuous in operation, the welder can vary both the slope of the volt-ampere curve and the amount of welding current independently to suit each job.

### Trailer

**H**OBART BROTHERS CO., Troy, Ohio, are now building a two-wheeled lightweight trailer for mounting their 200, 300 and



## NEW EQUIPMENT

400-amp. electric welders. Three bolts in the trailer frame register with three holes in the welding machines to fasten the units together and permit road speeds up to 35 miles per hr.

### Weatherproof Welder Cradle

**S**PECIALLY developed by the LeMaster-Conzett Co., Los Angeles, for service in shipyards, this welding plant cradle offers



quick transportation of four P & H square-frame welders built by Harnischfeger Corp., Milwaukee. Canvas rolls on the removable metal superstructure provide protection from inclement weather. The unit is either a four-man 200-amp. welding plant, or two welders may be parallel connected to make it a two-man 400 amp. outfit.

### Engine-Driven Arc Welder

**A** 200-AMP. d.c. engine-driven welder employing a new engine speed control is announced by the Lincoln Electric Co. It has a self-indicating voltage control and current control. The former, or job selector, directly regulates the engine speed from 1800 to 1400 r.p.m.



and also drops it to 900 r.p.m. for idling. The effect is to reduce fuel consumption to a minimum by keeping the engine speed down to that actually required for the job at hand. The welder will generate its rated current of 200 amp. at 1400 r.p.m.; higher speeds develop up to 250 amp.

### Protective Glass

**L**ARGE scale production of a welding plate called Filterweld has been inaugurated by American Optical Co., Southbridge, Mass. Filterweld is an absorption glass designed to protect eyes against the ultra violet and infra red rays encountered in arc welding and in oxyacetylene welding and flame cutting.

### Transformer Type Welders

**T**HREE new transformer type a.c. welders are announced by Larkin Lectro Products Corp., Taaffe Place, Brooklyn. The smallest unit is a 75-amp. model for operation on 110-v. 60 cycle current, with 30-amp. fuses. The larger



welders are of 150 and 250-amp. capacities. Operating on fixed open circuit voltage, between 60 and 65 volts, their principal feature is a sliding amperage control, which permits adjustment to within 1/2 amp. by turning a handle and reading an indicator.

### Oxyacetylene Cutting Tips

**A**SERIES of oxyacetylene machine cutting tips which are said to increase the cutting speed of machine torches by 20 to 30 per cent has been developed by Air Reduction, 60 E. 42nd St., New York.

The Airco "45" tip ejects a narrow, high velocity stream of oxygen, practically free of exit turbulence, burning a narrower path through the metal than the conventional tip, yet producing a cut of comparable quality. Seven sizes are available for cutting metal up to 8 in. in thickness.

### Electrode Holder

**J**ACKSON PRODUCTS, Detroit, announces a change in the design of their electric arc welding electrode holder to include a rod



bender. It is said to provide a quick convenient means of preparing rod for use. The company's line includes 10 models ranging in capacity from 200 to 500 amps.

### Hard-Facing Rods

**T**O those companies unable to furnish high priority ratings, Stooddy Co. Whittier, Cal., offers two new hard-facing alloys. These rods, unlike the majority of hard-facing rods now on the market, contain no chromium and can therefore be obtained on an A-10, P-100 rating. The manufacturer states that extensive field tests have proved the new rods comparable to regular Stooddy alloys from the combined viewpoints of ease of application and wear resistance.

### Alloy Steel Rod

**T**O conserve nickel, the American Manganese Steel Division, American Brake Shoe & Foundry Co., Chicago Heights, Ill., now has available a manganese steel welding rod known as V-Mang. An alloy steel containing 12 to 14 per cent manganese, molybdenum and other elements, this electrode can, it is said, be applied as readily as Amsco nickel manganese steel rod. Its ductility and tensile strength are equal to or better than nickel manganese steel rod as applied. V-Mang can be used to repair fractures in manganese steel parts as well as for built-up work, depositing a uniform bead similar to that obtained with nickel manganese electrodes.



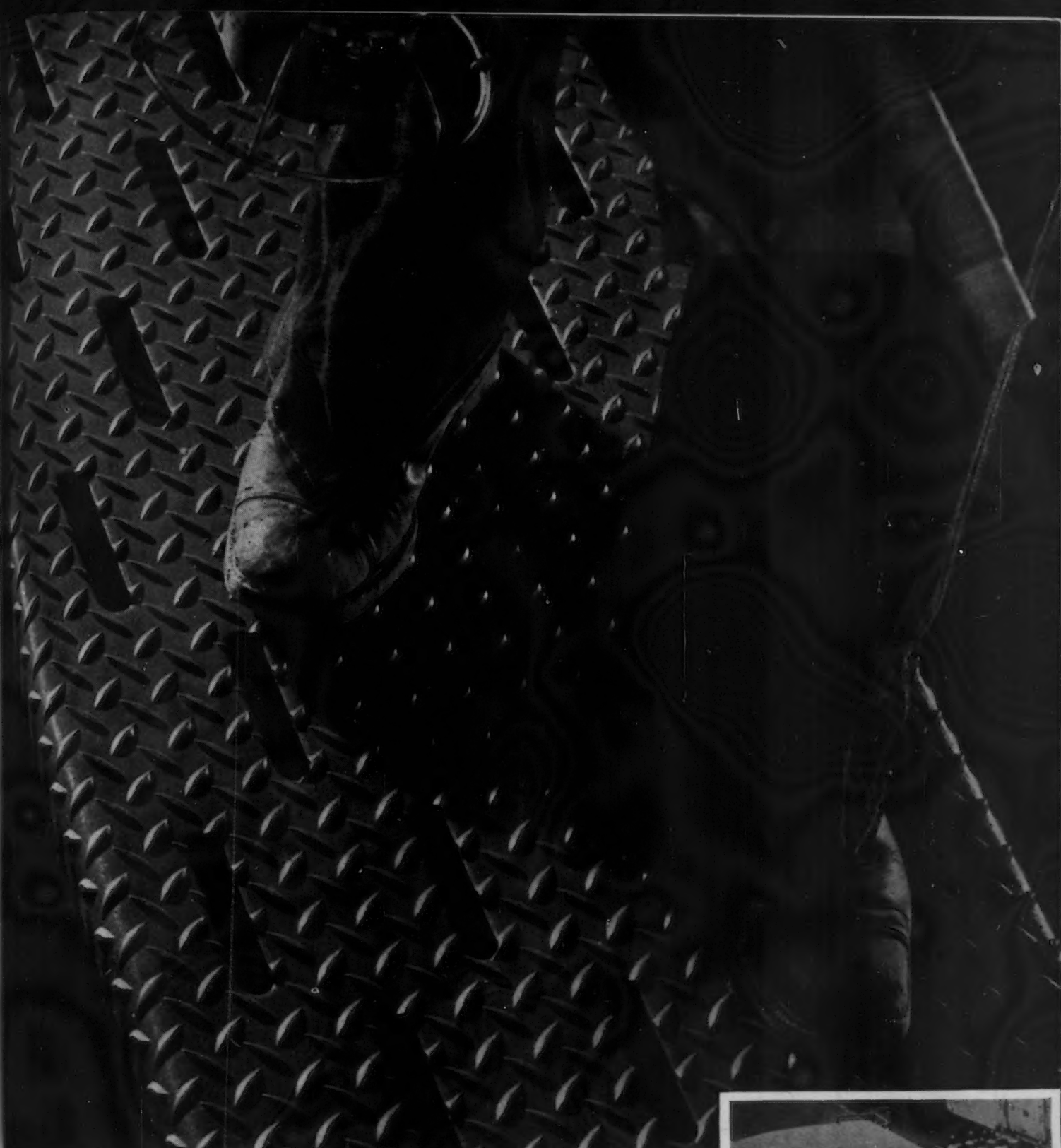
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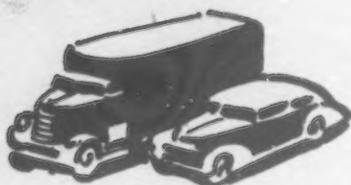
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# Assembly Line . . .

• Profit limitations foreshadowed by Continental price renegotiations . . . Post-war outlook for auto industry debated by Detroit . . . Await performance by UAW on Equality of Sacrifice campaign . . . Auto stockholders outnumber workers.



**D**ETROIT—Recent sessions in Washington at which Continental Motors Corp., of Detroit and Muskegon, served as a guinea pig in a program of renegotiation of war contract prices have stirred up conversation here about the probable relationship of wartime profits to peacetime profits and, incidentally, have raised the issue of the probable post-war positions of various automotive concerns, especially the independents.

Regarding war profits, authoritative sources here, apparently basing their words on ideas gleaned in Washington, express the opinion that a range of 3½ per cent to 8 per cent gross profit on sales, before taxes, is the current governmental aim. The lower figure is expected to refer to those whose war efforts are largely government-financed; the higher figure will be allowed those who are financing their own efforts.

Because most firms have contracts written upon various bases, depending on the particular product or total involved, or the time when the contract was signed, it is impossible to size up their positions quickly, or to guess what the profit limits will mean in terms of net profits on invested capital, or on their eventual financial position. But in view of the fact that one of the financial experts of the industry has already pointed out that money turns over about 20 times a year in

auto-making, and only 4 to 5 times in war production, no one believes that auto firms will approach their peacetime levels of earnings. As a generality it has been said that the 8 per cent figure is smaller than the comparable earnings by efficient auto makers in peacetime, after taxes, not before.

**T**HE independents, who have substantial portions of their contracts on a government-financed basis and may be expected to find their profits closely limited, appear unlikely to be able to improve greatly their capital positions, if this reasoning is at all correct, despite the fact that their level of operations is far higher than they have been accustomed to in recent years of auto making. If the war lasts several years or more, as assumed, these firms and others will probably end up with all their current automotive tools, dies, jigs and fixtures either unusable by virtue of obsolescence, or scrapped. In any event they face the prospect that the major units of the industry will, shortly after the end of the war, apply new ideas and materials to new auto designs, so the old equipment and tooling will have to be replaced by every concern in the industry—at a cost so great (for complete redesign) as to hurt many.

No one is predicting, yet, what the outcome will be, but the topic is being mulled over in many minds. The difficulties in formulating opinions are increased by such considerations as the knowledge that all industry is gaining speedily a lot of new ideas about designs, materials, and methods, and technological changes may upset all calculations. Without doubt, too, economic factors will weigh heavily. One of the industry's leaders expresses this relationship between our post-war economy and our autos of the future: "The automobile of the future will have to fit the economy in which it is used." There are those who believe that there will be post-war attempts by outsiders, especially aircraft plant operators, to enter auto markets with radically designed autos. (This opinion is interesting in view of the fact that a lot of people in the aircraft industry fear that auto firms will invade the aircraft markets with new designs.)

**I**F the war-period economy develops as indicated, the UAW-CIO won't have to concern itself with the 3 per cent dictum with which it recently has "needed" its "Victory Through Equality of Sacrifice" program.

That program, by the way, has been cautiously inspected by many people in the industry, but expressed opinions on it are few. Certainly the UAW proposal has few of the earmarks that are typical of other UAW proposals. True, it is colored to indicate that the union is going to be very self-sacrificing, and that industry has conived to be otherwise, and its presentation to the President of the United States and the press—but not to the industry itself—smacks a bit of playing-politics-as-usual. But the philosophy expressed in it is not such that anyone wants to pick flaws in it. In fact there are many people in the industry who think that the union deserves substantial praise for having adopted publicly a program that contains so much that is solid and substantial and worthwhile. They point out that if local unions of the international can be persuaded—as effectively as were the 1400 delegates to the UAW war emergency conference—to adopt the program, the nation will benefit immensely. An unfortunate aspect is that many of the local unions appear as recalcitrant as were some of the delegates. It will, for example, take some selling to get the idea across to the Buick local 599 which has gone on record as refusing to accept the report of its delegates to the conference.

**P**ERFORMANCE must measure up to the high-sounding words, but the high union officials provide a disappointment when they parade to Washington to present details of the plan to the President. They might better be engaged in a vigorous campaign to explain the details to the local groups and see that the high-sounding phrases are put into practice.

The specific points of the union proposal are:

1. The union will regard Saturdays, Sundays and holidays as ordinary working days and will forego premium pay when these days fall within the 40-hr. work week.



# Make Your Taps LAST LONGER!

The right lubrication helps. It will give faster production, better size control and smoother threads, too. Here are a few tips.

**First:** Use plenty of lubricant. Put it where it will do the most good. Force it into the hole parallel with the axis of the tap if you can — use two streams on horizontal tapping. For deep tapping and finer pitches, use light or diluted oil to insure reaching the point of the tool. Be sure it's flowing when the tap starts to cut. This helps wash out the chips, too.

**Second:** Keep the lubricant clean. When it becomes dirty or gritty, replace it with new, clean lubricant.

**Third:** — and very important, different materials require different lubricants for most efficient tapping. Your oil company's lubrication engineer will give you specific advice, but here are some useful general hints.



*This is one of a series of advertisements published by the Greenfield Tap and Die Corporation to help users get greater production from their taps. The entire series is now available in booklet form. Send for a copy.*

## SUGGESTED TAPPING LUBRICANTS

Material Being Tapped	Lubricant
Allegheny Metal.....	Sulphur Base Oil
Aluminum.....	Kerosene & Lard Oil
Bakelite.....	Dry
Brass.....	Compound or Light Base Oil
Bronze.....	Compound or Light Base Oil
Bronze—Manganese.....	Light Base Oil
Copper.....	Light Base Oil
Die Castings—Aluminum.....	Kerosene & Lard Oil
—Zinc.....	Compound
Duralumin.....	Compound or Kerosene & Lard Oil
Fiber.....	Dry
Iron—Cast.....	Dry or Compound
—Malleable.....	Compound or Sulphur Base Oil
Monel Metal.....	Sulphur Base Oil or Kerosene & Lard Oil

Material Being Tapped	Lubricant
Nickel Silver.....	Sulphur Base Oil or Kerosene & Lard Oil
Rubber Hard.....	Dry
Cast.....	Sulphur Base Oil
Chromium.....	Sulphur Base Oil
Machinery.....	Compound or Sulphur Base Oil or Kerosene & Paraffin
Manganese.....	Compound or Sulphur Base Oil or Kerosene & Paraffin
Steel	
Molybdenum.....	Sulphur Base Oil
Nickel.....	Sulphur Base Oil
Stainless.....	Sulphur Base Oil
Tool.....	Sulphur Base Oil or Kerosene & Lard Oil
Tungsten.....	Sulphur Base Oil
Vanadium.....	Sulphur Base Oil

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2. The union reaffirms its pledge to refrain from strikes or work stoppages.

3. The union commits itself to the increase of production of all war materials by collective and individual effort.

4. The union commits itself to the establishment of appropriate swing-shift work schedules.

5. The union demands control of profit from the basis of 3 per cent return on invested capital. (This point is discussed above.)

6. The union asks legislation to restrict earnings of individuals and families to \$25,000 per year maximum, including dividends, salaries and other sources of income. (Again, our war economy seems likely to follow the pattern established in England, where \$25,000 income is approximately the maximum. The ceiling is more likely to be imposed by high taxes than by actual prohibition on earning more than this figure.)

7. The union asks rigid fixing of prices and a downward revision of excessive prices. (No mention is made of a similar ceiling on wages.)

8. Rationing of all food, clothing, housing and other necessities. (This seems to be on the way but it is a big job.)

9. Adjustment of wages to meet increased living costs. (There are indications, even from government, that further upward adjustments of well-paid workers will not be permitted; Leon Henderson warns of the danger of further increases.)

10. Security for dependents of men and women in the armed services. (Again, this seems to be already accepted; only the number of dollars allotted each dependent seems open to debate.)

11. Moratorium on debts for those unemployed through conversion of industry and of all debts for those in the armed forces.

12. Labor seeks a Labor Production Division in WPB which, without encroaching upon the functions of management, should survey, encourage and recommend to the board all suggestions which hold a possibility of increasing war production.

13. Post-war planning by an agency composed of representatives of government, labor, industry and agriculture.

14. Upon acceptance and adoption of items labeled with the num-

bers 5 to 13, the union would agree that all wages for time over 40 hours per week should be paid in the form of non-negotiable special defense bonds to relieve existing pressure toward rising prices and create a cushion of purchasing power for the post-war period. (A measure favored by many, but certainly not a sacrifice, even though some have tried to paint it as such. It is merely an automatic savings device of mutual benefit to the individuals and the nation if adopted.)

ON one score, the sacrifices of the individual owners of the industrial world, the stockholders, seem to have been overlooked. As pointed out above, profits will be very slim. This will be reflected in the income of a great many stockholders, including many individuals, insurance companies, charitable institutions, schools and all of the other holders of stock certificates. In the auto industry alone, as an example, there are more stockholders (710,000) than the greatest number of workmen ever employed by the industry in manufacturing cars and trucks. Since the earnings and dividends of the industry are expected to reach the lowest point in years, these 710,000 stockholders will be making more real sacrifice than the average UAW worker in an auto-war plant will be expected to make. The stockholders' sacrifice, too, will be made "before taxes."

A summary of opinion on the union's proposed program is that everyone — capital, management and labor—is equally interested in winning the war and that each will be called upon to make its own sacrifices. There is no disposition to pick flaws in the UAW program. But a proper perspective must be adopted in examining the plan and the union certainly is not in a position to claim that any major portion of the sacrifice is being made by its members. In a critical vein, it might be said that the plan is overdue and that it already is being over-emphasized in its political aspects. Observers are expecting to see a great deal more publicity regarding the plan after the union's visit with the President.

Regarding the Continental negotiations with the government (mentioned above) C. J. Reese, president of Continental, issued a statement

last week stating that the company had been placed in a false and unfavorable light as a result of a newspaper dispatch from Washington saying that it had "refunded" to the government \$40 million in excess profits. Actually, the \$40 million ascribed to the company was not a refund, but a reduction in over-all price of existing contracts for war goods which are in the process of manufacture or will be manufactured in the future. This price reduction was agreed upon between officials of the company and government negotiators after a review of operations for the last several months and was based upon improved efficiency, including mechanical and labor improvements and a forthcoming doubling of Continental's production schedule.

THE "refunding" aspect is said to have its only basis of fact in the fact that the government does retain the right—in any contract—to obtain a refund if profits are proved to be too high. This aspect may be played on considerably in re-negotiations of some other contracts.

"To show you just how ridiculous is the statement that we have 'refunded' \$40,000,000 to the government," Reese declared, "here is our financial statement as of February 28, 1942." The statement showed that the company's total assets on that date were only \$39,871,000.

The clear significance of the Continental negotiations is that they form the starting point for similar negotiations with many other companies engaged in war goods production, it is stated.

### Auto Plant Workers Protest President's \$40,000 Bonus

Toledo

••• Hundreds of employees of the Willys Overland Motors, Inc., recently staged a mass protest meeting in front of the plant, demanding that the annual \$40,000 bonus paid to Joseph W. Frazer, president, be divided among employees. The men staging the protest are members of Local 12 of the CIO United Automobile Workers. A Labor Department conciliator is expected to meet with union and company representatives to iron out difficulties.



# "PLOWSHARES *into* SWORDS"

*... Modern Version*



AS America turns her "plowshares into swords," she looks to the Iron and Steel Industry for production of the vast quantities of raw materials needed for tanks and guns and ships and shells.

That the McKee organization has aided the industry's war-time effort is evident in the fact that McKee has, during the past five years, undertaken construction of facilities for the annual production of more than 8¼ million net tons of iron and steel. Three-quarters of this total represents *new capacity*.

And when the sword is again "beaten into a plowshare"—when tanks become tractors, America will turn again to the Iron and Steel Industry for material for the implements of peace.

That's why McKee is designing and building *now* with an eye to the needs of the future.



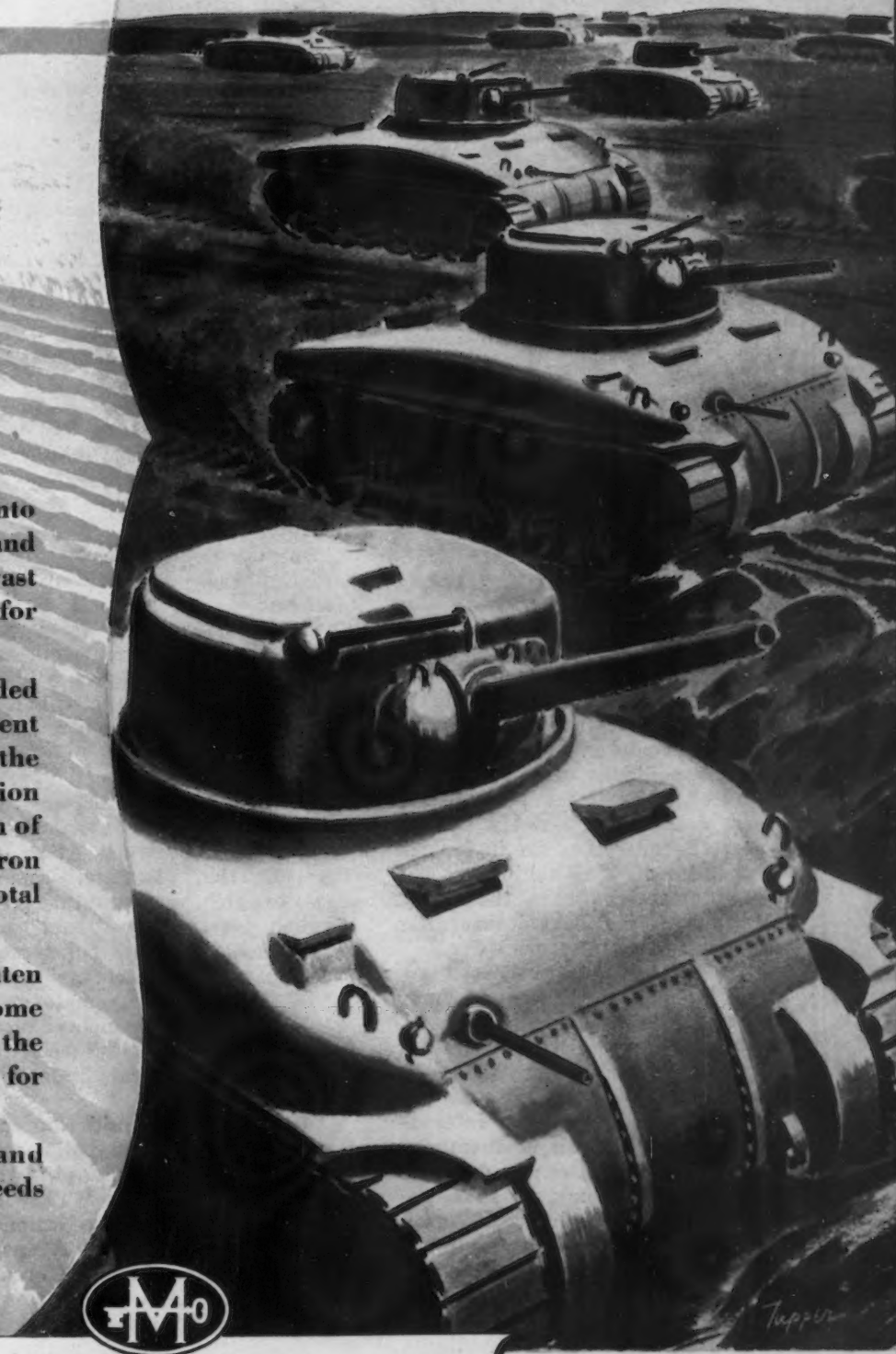
**Arthur G. McKee & Company**

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2300 CHESTER AVENUE • CLEVELAND, OHIO

ROCKEFELLER PLAZA  
NEW YORK, N. Y.

COMMERCE BUILDING  
HOUSTON, TEXAS



# Washington . . .

• Post-war planners spend their days in dreaming of the future, but these dreams will form the nightmares of business . . . One schemer advocates a world wide PWA.



*The moving finger writes; and  
having writ,  
Moves on; nor all your piety nor  
wit  
Shall lure it back to cancel half a  
line,  
Nor your tears wash out a word  
of it.*

**W**ASHINGTON—Omar's prophecy should be long remembered by industrialists who hope ideas of governmental control of business born in the past decade will, like the locusts, pass. Because they are in for disappointment if Washington economic messiahs have their way. Anyhow, if the ideas do pass, like the locusts, they return.

The National Resources Planning Committee, WPB, and many other agencies are vying to blueprint the post-war world, but what plan has priority, nobody knows. Some of the schemes are on a national and others on an international scale, but all of them aim to project the pattern of our past "planned" economy to save the country or the world from certain future disaster. But not all are Jeremiahs. Right now Trust Buster Thurman W. Arnold is picturing a post-war Utopia.

Like the immortal inhabitants of Sleepy Hollow, these planners spend their days in dreaming, but these dreams are not pastoral, and

not innocuous. They will form the nightmares of business after the war, when the long heralded business recession arrives. At least most business people definitely believe that there will be an oversize recession, no matter what government planners try to do to avoid it.

**O**NE of the WPB super-schemers advocates a world PWA to take care of public works, a world adjustment of tariff rates, wages, interest, taxes, prices, currency and the distribution of goods. Universal coverage of all persons for vocational training, medical care, unemployment compensation and old age benefits is recommended. World-wide pensions for war veterans are thought needed.

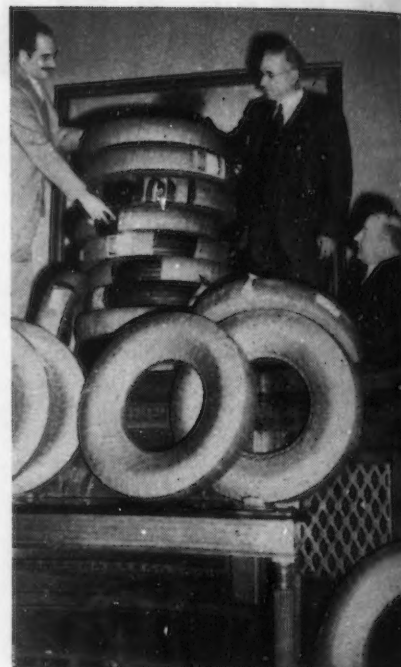
Credit risk insurance to cushion governmental "pump priming" spending is another proposal. Surplus commodities are to be sold on a system approaching the AAA Food Stamp Plan at slightly above cost. International control of sales quotas and patent rights is on the list.

An example of some of the higher phraseology of this plan follows:

"If substantial full or partial non-frictional unemployment still existed in an essential industry after trying all other self-liquidating economic stimulants and balancers—"

**S**O were we perplexed when we first saw this evidence of stratosphere thinking. After letting off the gas and coming down to earth, we found that plain English for "non-frictional" unemployment would be "unemployment caused by economic collapse." "Frictional" unemployment would be "unemployment caused by machines replacing men," or some similar temporary industrial dislocation.

The "other self-liquidating economic stimulants and balancers" to help labor will be placed in the hands of a successor to WPB with the tentative name of the National Employment Maintenance Agency. NEMA will have charge of credit risk insurance, credit rates, taxes, subsidies, pooling of facilities in a "share the work" program, prices, production control, and social security, etc., in the United States.



AP Photo  
**TIRES FOR CONGRESS:** For a "Congressional investigation" of the merits of the new Victory camel-back tires, members of the House Interstate and Foreign Commerce Committee were given 18 of these tires to conduct their own road tests.

**I**NTERNATIONAL phases, under this invention, would be carried on by a bureau named the International Employment Maintenance Agency which is to be advised by but may over-rule or adjust some NEMA recommendations. IEMA would have exclusive control of international tariff rates, sales quotas, patent rights, but only advisory powers with respect to international credit rates, commodity and product prices which are controlled by NEMA bureaus in the countries affected, bargaining between themselves.

The global government would have a representative head. An administrative arm of a court of International Justice would have veto power over the actions of the Armament Production and Distribution Unit of IEMA and directly control the International Police Force. All national armaments would be reduced and pooled.

"All existing Federal and state government agencies will be tentatively disbanded and considered



# GIVE PRIORITY TO PRODUCTION



## SUNOCO EMULSIFYING CUTTING OIL

*permits increased speeds and feeds... longer tool life*

To keep American tanks, planes, guns and shells streaming from assembly lines, machine tools — those master tools for victory — must operate at continuous top speed. Unproductive "set-up" time must be cut to the minimum... speeds, feeds and tool life increased... extreme accuracy maintained — all to produce more work in less time.

That's the problem Sun Oil Engineers — those "Doctors of Industry" — have solved by

putting Sunoco Emulsifying Cutting Oil to work in plants throughout the nation.

Sun "Doctors of Industry" are ready... willing and able to help you increase machine tool productivity in your shop... under your own operating conditions. Their services are yours to use in stepping up output. Write or wire

**SUN OIL COMPANY, Phila.**



**SUNOCO**

### PERFORMANCE DATA

OPERATION — Machin-  
g coupling from steel  
ring @ 98 R.P.M.

MACHINE — 2-L Gis-  
selt Lathes.

TOLERANCE — .001"

CUTTING LUBRICANT  
— 1 part Sunoco to 15  
parts water.

**SUN PETROLEUM PRODUCTS** HELPING INDUSTRY HELP AMERICA

as a pool from which blocks of personnel may be drawn to carry out the necessary functions of such governments as reorganized to administer the transition and long-time plans for post-war full employment," so say the planners.

IEMA policies are to be governed by an International Employment Maintenance Congress composed of not more than 300 members representing all nations, national representation to be governed partly by population and partly by net national income and its distribution. One member may represent several nations, but may be appointed and removed by the executive heads of respective governments.

**T**HERE would be no international restrictions upon the type of government within any nation nor upon the means used by executive heads of national government to retain office except as indicated.

International disputes would be subject to compulsory arbitration not covered by existing law. Areas to be covered by binding international law are to be gradually enlarged by the Congress. The Court of International Justice would decide international arbitration

cases and possess a number of separate departmental staffs to hear and tentatively decide different types of cases.

An international bank would control currencies, and rates of exchange, and a separate organization would be organized to check NEMA and IEMA on a quarterly basis to see if the programs are flowing smoothly.

Labor, the principal theme of the plan, supposedly would benefit greatly but wage rates and hours, union responsibility and finances would be subject to control. The author says that the basic theory underlying the program is that it is more economical and socially desirable to utilize idle labor for producing a surplus product than to make work of the boondoggle type. Disputes would be arbitrated.

**T**HE plan would still—ostensibly, at least—permit the "maintenance of industrial initiative in the hands of private enterprise." NEMA and IEMA would prepare and publish in advance tentative "production-employment" budgets for all major classes of economic activity. The budgets would be made by getting industry figures on production and labor,

and then fixing what production and employment should be to maintain the minimum employment level thought to be essential. The most practical production methods would be recommended, making allowances for a "survival of the fittest" policy. However, foregoing the budgets would not be mandatory but advisory and would represent the tentative production and employment goals underlying any stimulative or repressive economic actions, taken.

It is claimed that the plan would save \$333,000,000,000, by forestalling economic depression, reducing the cost of post-war relief, by more quickly reducing the production of armaments to peace levels, losses from unbalanced post-war economic development, and avoiding "another world war before 1980."

**T**HE National Resources Planning Committee's plan resembles the WPB scheme, but the outstanding distinguishing feature is the former's proposed expenditure of \$25,000,000,000 in public works.

Perhaps because it is a mere bagatelle in these days of financial affluence, no one has bothered to say what the cost of all of these grandiose ideas will be.

The General Electric Co. is one of the very few concerns which has made a post-war plan of its own. Washington sages are scouting it. Particularly subject to attack is the statement of one GE official regarding their plan.

"It's just a simple straightforward production job based on a few years instead of months."

GE has instituted a continuous market appraisal for the future, with regard to the sale of products to be sold after the war. The questions the company is asking pertain to what it can produce after the war, and how much, the number of men required, the number and types of machines necessary. The machines which likely will be obsolescent have been marked for junking. Employee training plans have been drawn to take care of the new manufactures.

The messiahs claim that such plans are too simple and selfish, though practical, they admit. The economists are calling for a "master architect" of the world. If they look hard enough they will very likely find one.

And this is the shape of things to come—maybe.

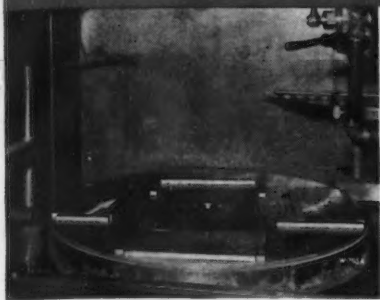
## THE BULL OF THE WOODS

BY J. R. WILLIAMS





**"PUT IT ON THE BLANCHARD"**



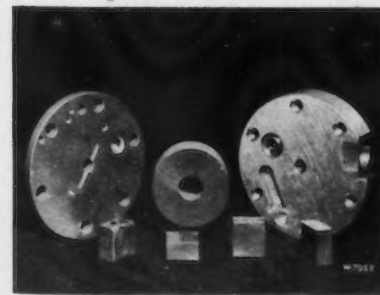
*Sides ground parallel within .00015"*



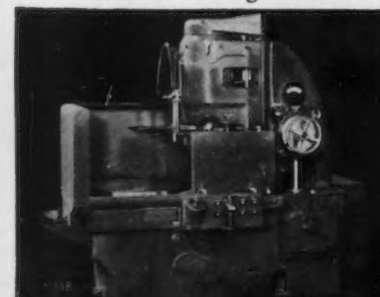
*One end ground square with side within .0001"*



*Other end ground square within .0001" parallel within .00015"*



*End plate, roll, and blades — all Blanchard ground*



*No. 18 Blanchard Grinder*

# SQUARE

**WITHIN .0001"**

Two Blanchard, No. 18 Surface Grinders, with Blanchard fixtures produce these refrigerator compressor blades to extremely close limits for accuracy and finish — at a rate of 1000 complete blades (ground 6 sides) every 8 hours.

360 blades are held on the chuck at one time while one side is being ground, then they are turned over and the other side is ground parallel within .00015". The ends and edges of the blades are then ground in six 10-station fixtures mounted on the chuck.

A Blanchard Demagnetizer is used between each operation on both the work and fixtures.

## BLANCHARD MACHINE COMPANY

64 STATE ST., CAMBRIDGE, MASS.



Send for your free copy of "Work Done on the Blanchard." This book shows over 100 actual jobs where the Blanchard Principle is earning profits for Blanchard owners.



**CHECK THESE ADVANTAGES OF BLANCHARD GRINDING**

- ★ **Production**
- ★ **Adaptability**
- Fixture Saving**
- Operation Saving**
- Material Saving**
- ★ **Fine Finish**
- ★ **Flatness**
- ★ **Close Limits**

..... Especially valuable on jobs like the one illustrated.

# WEST COAST

• Labor feels it should have place at table with new Aircraft War Production Council . . . Two Pacific Coast developments to alleviate tin shortage . . . Shipyards' problems dwindling.



**L**OS ANGELES—Almost as surprising as the Vichy flip-flop was the appearance last week of leaders of one of the aircraft industry's largest AFL unions in the CIO camp, ready to join in the latter's spring offensive.

Two weeks ago the CIO United Automobile Workers, attempting to organize the aircraft industry, got wind of a plan by southern California aircraft manufacturers to form an Aircraft War Production Council more closely to integrate administration, engineering and production of the individual plants. Before the manufacturers could announce the Council, the UAW cooked up a suggestion for such a group, dressed it in similar plumage, and fed it to the press. The plan suggested by the CIO differed, however, in the important point that the inter-company Council would have substantial labor representation. Upon closer analysis, definite suspicions were aroused that Detroit's Reuther plan had been knocked down and transported to the Coast, where the UAW hoped to put it into full blast.

The aircraft companies ignored the UAW's plan and went ahead and announced the inter-company Council as originally worked out, without labor representation.

**L**AST week formation was announced of a so-called "joint AFL-CIO production for victory committee" comprised of represen-

tatives of the CIO unions which act as bargaining agents at Vultee and North American and of the AFL Aeronautical Machinists which is bargaining agent at Lockheed and Vega. Conspicuous by their absence were representatives from Douglas, Consolidated, Northrop and Ryan. Ryan undoubtedly will be represented.

Jack Montgomery, regional director of the UAW, is temporary chairman of the committee which claims to represent more than 50,000 organized workers.

At its first meeting, the labor committee lost no time in terming the management council "a step in the right direction" but said that it was "deeply perplexed at the failure of the aircraft management to make a place for labor representation." Without the contribution of the workers "who are determined to produce more and improved bombers and fighting planes," any program evolved by the management council will be "definitely limited in its scope and effectiveness," the union committee declared.

Mr. Montgomery explained that "labor feels that it should have a place at the council tables in the discussion of production problems. Labor feels that the American people desire that labor be represented. The United States government through the War Production Board has already requested that labor be allowed to participate in bringing about all-out production . . . there are those who might state that labor's motives are selfish in attempting to gain a place in the production discussions of the aircraft industry. We have only one interest. Win the War!"

**I**N the Montgomery statement is the banner which the AFL-CIO committee will carry in its spring push: A demand that the formation of management-labor councils within individual plants, as requested by Donald Nelson, be inflated into an industry wide labor-management council. What comes behind this banner—whether it is winning the war or something closer to the pay envelope—is moot. It is fair to point out that the Ford Willow Run plant in the East is completely organized by the UAW with check-off system. Wages at the Willow Run

plant run from 95 cents to \$1.65 an hour—well above the West Coast scale. The dominant labor organization pattern of the automotive-aviation industry in the East is all UAW-CIO, with contracts in the individual plants varying in extent of unionization. It is also fair to point out that April 1 was the expiration date of Vultee's contract with UAW Local 807 which was agreed upon after the memorable strike of November, 1940. Specific union demands have not yet been announced, but the union acknowledges that reclassification of wage scales is being taken up. Last Sunday in Los Angeles the CIO held a "Production for Victory Convention" with Harry Bridges as the keynote speaker. In labor's terminology, the "spring push" may not all take place in Russia.

Management's Aircraft War Production Council needs no warning as to what it is up against, but some weaknesses in the council, itself, are apparent. If the council takes in none but southern California aircraft manufacturers, as a group, it is without contact with aircraft manufacturers in other parts of the country, and more important, has no real liaison with the aircraft makers in the automotive industry. Such a relationship, forgetting such rivalry as may drift between the old line aircraft makers and the men from the automotive field, would be particularly beneficial to the Coast group. From a labor organization standpoint, the automotive industry has been through the knot hole already, and is in a good position to explain just how the Reuther plan is baited.

**G**EN. WILLIAM S. KNUDSEN inspected southern California aircraft plants last week but in his comments skirted the labor question by advocating shelving of private wars and concentration on our war with the Axis. He believed that the production goal of 60,000 planes this year and 125,000 in 1943 would be met.

Balked in its efforts to be recognized as a unit of the AFL, against which it staged several spectacular but abortive strikes last year, the independent welders union is now seeking recognition as a bargaining agent in its own name. The United



To Right: A sectional view of Continental Tool Division of Ex-Cell-O Corporation grinding broaches and other precision-made Continental cutting tools.

Below: A few of the many precision cutting tools made by Continental Tool Division of Ex-Cell-O.

To Right: The Continental Counterbore with the indestructible drive... and various precision cutting tools made by Ex-Cell-O with this well known drive.

## Where QUALITY and WORKMANSHIP count!

Cutting tools . . . made right . . . are becoming more and more vital in the rush for war production. There's no time now to experiment with inexperienced cutting tool sources. Continental engineers at Ex-Cell-O Corporation have been making high-grade cutting tools of many types and sizes for more than 25 years.

EX-CELL-O CORPORATION • DETROIT, MICHIGAN

**EX-CELL-O**  
*XLO Precision*

**MACHINES  
AND TOOLS**

To Left: A few of the many carbide-tipped cutting tools made by Continental Tool Division of Ex-Cell-O.

To Right: Where sizable production with close accuracy and good finish are required, broaching has many advantages. Shown are some of the different kinds of broaches produced by Continental.

Below: Another sectional view of Ex-Cell-O's Continental Division, where standard and special cutting tools of various types and sizes are made for war production jobs.

Here: Another widely-used cutting tool bearing the universal name... inserted into face milling cutter.

**XLO**

EX-CELL-O PRECISION

Brotherhood of Welders, Cutters & Helpers of America, the official title of the organization, is appearing in hearings before the National Labor Relations Board at Seattle to present its petition for certification as the collective bargaining agency for 13 Seattle, and one Everett, Wash., plants. Included among the plants and shops in which the independent union seeks an election to determine bargaining rights are the Pacific Car & Foundry Co., Washington Iron Works, Isaacson Iron Works, Puget Sound Machinery Depot, Young Iron Works, Markey Machinery Co., Western Blower Co., and the Sumner Iron Works. This list includes all of the major steel fabricators in the Seattle area, but noticeable for their absence from the list are the shipyards against which the union struck last fall. Specifically the hearing will determine whether the independent union can be classed as an appropriate bargaining unit, and then whether elections should be held. If the union is successful at the hearing, and then wins these elections, the shipyards will undoubtedly be next on the list.

North American Aviation, Inc., is building combat training planes at approximately 66 per cent of the cost of these same planes in the summer of 1940 although the costs of labor and material are now substantially higher. Standardization of designs by the Army and Navy on training plane designs, presumably on the AT-6A and the SNJ-3, permitting smoother functioning of production, is allowing the company to return \$14,000,000 to the government in the form of price reductions on contracts in progress. In addition, the company has reduced prices on contracts held but not now in process to the tune of almost \$60,000,000.

**T**WO Pacific Coast developments are under way to alleviate the tin shortage. Definite announcement that one of the government sponsored detinning plants will be built in southern California by the California Detinning Co. was made by C. M. Gregg, president of Los Angeles By-Products Co., which currently also operates a detinning plant. The California Detinning Co. plant will have a monthly capacity of 4500 tons of tin cans to be obtained from south-

### Faulty Arithmetic in Freight Bill Example

• • • In the March 26 "West Coast" column discussing steel freight rates to the Coast the freight bill of an imaginary shipbuilder was cited as an illustration of how large a proportion of shipbuilding cost goes for freight on steel. It was estimated that this shipbuilder would require 7,500,000 tons of steel over a period of five years to build a 500-vessel-a-year program. His freight bill, assuming all the steel was shipped from the Birmingham or Chicago district would be \$175,500,000 on the current rate of \$1.17 per 100 lb. This freight bill was erroneously computed and reported in the March 26 column as \$8,775,000 which would be on a rate of \$1.17 per ton.

ern California metropolitan disposal centers. In San Francisco, reports were made on experiments of Shell Chemical Co., subsidiary of the oil firm, on a plastic coating to replace tin on coated containers. The difficulty with most substitute coatings for tin has been that they would not stand up under the 300 degree temperatures needed to cook and preserve food. Preliminary tests on Shell's plastic indicate it will stand heat in excess of 500 degrees. The plastic is described as having an allyl alcohol base, which Shell has been producing as an outgrowth of earlier processes for making synthetic glycerine in conjunction with its refinery operations. The other principal ingredient of the coating is phthalic acid, of the coal tar group. The company was careful to point out that its experiments are still far from commercial use.

**T**HAT difficulties of Pacific Coast shipbuilders in obtaining materials and fittings are gradually clearing up becomes evident with the announcement that one of the Kaiser yards has outfitted a 10,000-ton Liberty freighter in 44 days, substantially quicker than previous records. Coupled with this record was an announcement by the Maritime Commission's Pacific Coast director that, unless further shortage of material develops, ship construction on the Pacific Coast will be tripled by

November or December. He placed the goal of Coast yards at nine million tons a year. Yard executives reflect greater satisfaction with delivery of materials and fittings than for some time. Most serious delays have occurred in yards departing from base designs and doing special conversion work. Where such work is undertaken on short notice, advance scheduling of material requirements is impossible, and some delay naturally follows. Minor labor difficulty delayed production at a San Joaquin Valley plant converting its machine shop from the manufacture of tractor equipment to military barges. The AFL Machinists & Auto Mechanics Union threw a picket line around the plant but operations continued.

With a view toward alleviating a possible future shortage of shipyard labor, the United States Employment Service will train construction crews at two large Oregon cantonment projects outside of working hours for shipyard work. Fifteen thousand men employed at the cantonment projects will be eligible for the training.

With construction on the lower Columbia River yard of the Kaiser Co., Inc., approximately half finished, the keel has already been laid on one vessel. This firm has announced that it will employ its workers regardless of union affiliation, a blow to the AFL which has closed shop at most Coast yards.

### 6000 Allis-Chalmers Workers Get 10 to 50-Year Emblems

*Milwaukee*

• • • Nearly 6000 employees of Allis-Chalmers Mfg. Co., have been presented with certificates and emblems of service, ranging from 10 to more than 50 years. Forty-one had 50 or more years of service, 155 had 40 years, 690 had 30 years, and 1477 had 20 years or more.

### Relocated Blast Furnace to Aid Columbia Steel Co.

*San Francisco*

• • • Capacity of one Columbia Steel Co. plant will be increased through the re-erection of a blast furnace brought from another United States Steel Corp. plant at Joliet, Ill.



## TRUSCON Announces New-Type Steel Box

for Materials Storage and Handling Advantages!

Another Truscon development... a heavy-duty corrugated steel box and platform unit with hinged end door, for fast, efficient handling of hot or cold small forgings or parts!



**T**HE BOTTOM of the box is smooth and of heavy gauge steel so that when placed on a rack and tilted approximately 20 degrees, parts will flow easily through the door opening onto a table or other place convenient to the worker. The door is equipped with heavy duty forged hinges, reinforced and riveted in place. A slotted bar on one side of the door makes it easy to open this unit to any angle desired, thereby controlling the flow of

material from the box. This new Truscon box may be used with forked trucks and may be equipped with tiering or crane lugs for efficient storage and handling.

Let us work with you on any of your materials handling problems, so that we can make worthwhile suggestions. Truscon Steel Company, Pressed Steel Division, 6100 Truscon Avenue, Cleveland, Ohio. Subsidiary of Republic Steel Corporation.

### TRUSCON MATERIALS HANDLING EQUIPMENT

YOU'LL FIND IT WILL PAY TO **TRUSCONVEY** YOUR PLANT MATERIALS

# Fatigue Cracks

BY A. H. DIX

## Bronze Mine

Has anything been done about salvaging scrap metal in the tons of bronze statues around the country? There must be a good many tons of copper and tin tied up in such eyesores. Remember this country got some of its original munitions by pulling down a statue of George the Third.

—George Appel

The suggestion is being passed along to the WPB Material Division's copper chief, H. O. King, with some modifications. You cannot indict an entire art form. Not every bronze statue is an eyesore. Furthermore, the wholesale remelting of local heroes would create resentment in carload lots.

The campaign should be conducted systematically. First the WPB should have a clock check the volume of sidewalk traffic in front of a given statue and record the proportion of other than casual glances the statue receives on an average day. It is well-known that the local citizenry can rarely tell you the name of the verdigris-coated notable who puts in a 168-hr. week in front of the city hall. Statues are consciously seen only by the transient trade.

Therefore, where transients are thick the fact will be reflected in the attention rating established by the clocker. Statues failing to make a par of say 2 per cent will be candidates for remelting. Cities will thus have an opportunity to free themselves painlessly and patriotically of bronze warts on the municipal visage. Cries of the inevitable objectors can be stilled by training the floodlights of war necessity on the campaign and imputing sinister motives to those who assume a scrapman-spare-that-statue attitude. They can be further mollified by erecting in place of the statue a small plaque reading "The bronze body of John J. Philph, founder of Philphville, is helping win the War for Survival."

As a starter, we would like to contribute Commodore Vanderbilt, who stands in front of the Grand Central Station and whose attention rating is almost zero. For the elevated automobile ramp that winds around the station makes the statue invisible from the street, and, being situated at a sharp turn in a four-lane traffic stream, even the visiting motoring public cannot spare it a glance. Very likely no one but us and the occupants of the Commodore Hotel's southwest corner rooms, know it is there. We would miss it, but we are willing to do our bit.

## Neat Trick

• • • shafts of light cast up by molten steel being rolled into sheet bars . . .

—Life

Must be an exciting spectacle, like watching the assembling of a chicken soup sandwich.

## Blurb

• • • Never before in the 87 years your favorite family journal has been shedding its light has an issue had as much circulation as this one. It would be wise to say no more, for we have noticed that when we announce our actual circulation people usually say politely, "That's nice," but they look disappointed, and if we press them they say, "Frankly I thought it ran into hundreds of thousands."

This flattering exaggeration is doubtless caused by the fact that most IRON AGE subscriptions are in company names. Copies are passed from one man to another, and oftentimes a single copy serves a dozen readers.

The circulation figure that has caused the curve on our wall chart to crawl up on the plaster is 18,900. In the circles we travel in this figure is 'way uptown.

## Gurgle, Gurgle

• • • We often wondered where the word *blurb* originated. Now we think we know. Carroll Buzby, of our sister publication, *Commercial Car Journal*, says that in old New England cook books, it was quite common for recipes to call for "three blurps" of molasses.

The "blurb" was based on the noise the molasses makes when it runs out of the jug. Evidently the size of the jugs was sufficiently uniform to have a "blurb" indicate a pretty definite quantity.

The advent of measuring cups sounded the knell of *blurb*, but its memory is perpetuated by its child *blurb*, meaning the sound made by a publisher in praise of his work.

## Castor Oil with a Smile

• • • During the last depression one of our brass hats had become so adept at announcing salary reductions that he could make the news of another 10 per cent cut sound almost like a raise. There is a technique about such things. Our own WPB and OPA have hewed to straightforward-matter-of-factness in administering the bitter pills of production, sales and price restrictions. They have tried neither to coddle the patient nor frighten him unnecessarily, and we think their bedside manners are admirable.

The British are trying another technique, as instance their treatment of tire rationing. The *New York Times* reports a spokesman of the Ministry of Supply as saying, "The government's attitude is one of complete ruthlessness. . . . Henceforth every one must accept whatever is issued to him—new, retreaded or second hand. A discarded tire must be surrendered without payment. . . . There will be a gap to be bridged between the exhaustion of stocks and the big flow of synthetic rubber that we are hoping to get, mostly from the United States. . . ."

It doesn't sound ruthless to us, but reminds us rather of a down cushion plated with hard metal. We think our own public is already conditioned to candor; that it can take its castor oil straight, and that instead of writhing under war restrictions it may even welcome them. For it is natural for everyone to want to feel he is having a hand in helping win the war, and to permit audience participation is sound psychology.

## Typewriter Ribbon Makers' Friend

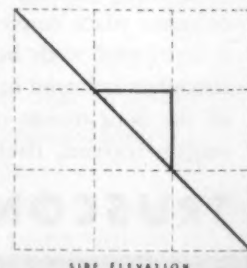
• • • We have never examined our subscription list name for name to find who works our stencil cutter hardest, but we will gamble that it is the Chinese Aircraft Engine Factory Commission on Aeronautical Affairs—59 letters, and a pretty mouthful to fill in on a check.

## Puzzles

Lt. Com. A. R. Simpson says the diagram to the right is the answer to last week's problem. If you find it unsatisfactory you can fight it out with the Navy and we will act as middleman. But, as pointed out by R. H. (Electroloy Co.) Taylor and James T. Gordon, this is just one of a number of correct solutions.

Two minutes should do for this:

A swimming pool which contains 1000 cu. yds. of water can be filled by either of two inlet pipes in three and four hours respectively; and can be emptied by either of two outlet pipes in five and six hours respectively. How long does it take to fill the tank if both inlet pipes and both outlet pipes are open?





# COPPCO

FOR DEPENDABLE

PERFORMANCE

## TOOL STEELS



These blanking dies are an example of the successful use of Coppco Tool Steels. They are made from "Coppco 200"—black label—an oil-hardening steel. We welcome inquiries on your tool steel requirements.

### COPPERWELD STEEL COMPANY WARREN, OHIO

#### "COPPCO .75"

Hardens to give greater toughness than Coppco Universal or Coppco 1.10

#### "COPPCO UNIVERSAL"

Balanced hardness and toughness  
Good cold cutting properties



#### "COPPCO 1.10"

Gives maximum hardness  
Holds a keen cutting edge  
Resists wear

"COPPCO 200"  
Non-deforming · Deep-hardening  
Wear resistant

— WATER HARDENING  
— OIL HARDENING

# Dear Editor:

## CONVERSION TO WAR WORK

Sir:

• I noted with interest your article of April 9 about the ingenuity of small plants in landing work on war production. Now as I read the title again it occurs to me that possibly it should not be necessary for small plants to utilize such tremendous ingenuity in order to get work.

There must be some way to overcome the difficulties that small manufacturers now experience in order to get war work. As you say, instances where small plants are being handed war work out of a clear sky are becoming rare, and it is true that landing suitable jobs involves "utmost determination and aggressiveness."

Your article, however, gave me an idea which might be able to be worked out in regard to getting work to the small plants. It would seem to me that a systemized approach to the problem would involve:

A list of all unused capacity classified by:

1. Type of work.
2. Accuracy of work.

This information of available facilities would be fairly simple to get together from information which is already available. It could be made up from such surveys as those made by the Willys-Overland Company, which was written up in the last IRON AGE; WPB Ordnance District Surveys; and surveys such as that made by the Connecticut Manufacturers Association. The idea would be to make a composite catalog of all available places where work of various kinds could be done, and how much of it.

Along with this, there would be:

A list of what needed to be made

1. Needed present capacity for each article.
2. Needed future capacity for each article.

Classification of articles

1. By type of work required.
2. By accuracy required.

This central information bureau would receive all requests for bids from all government agencies, and an invitation to bid, and drawings and specifications would be sent to selected plants according to their capacity to produce the material. . . .

Gordon L. Hall, Manager,  
The Gordon L. Hall Co.,  
Old Lyme, Conn.

A formula devised by James Stanley will shortly be tried in the Chicago area, by order of Donald Nelson. The formula is based on tools as the common denominator of war production. Available tool facilities will be classified by code letters. Available contracts will be similarly coded, and one matched against the other. If the Chicago experiment is successful, the formula will be applied nationally.—Ed.

## DURIBRONZE

Sir:

• In the April 2 issue, you asked if anyone is familiar with Duribronze.

74—THE IRON AGE, April 23, 1942

It is possible that Mr. Agricola refers to the material produced by the successors of the Durigold Company of America, now operating under a different name. They are located at Kokomo, Ind., and it is my understanding that they are now manufacturing a bright bronze for art metal objects particularly.

S. M. Brah, Training Advisor,  
Rustless Iron and Steel Corp.,  
Baltimore, Md.

## MORE HEADWORK

Sir:

• I shall appreciate it very sincerely your forwarding to me six copies of the editorial, "More Head Work, Less Foot Work."

I consider this a very fine article and would like very much to use it to advantage.

Chas. T. Woodroof,  
American Radiator & Standard Sanitary Corp.,  
Pittsburgh, Pa.

## CARTRIDGE MANUFACTURE

Sir:

• We would appreciate receiving a reprint of Lt. E. C. Bomar's article entitled "Equipping a Cartridge Case Shop" which appeared in THE IRON AGE issue of October 10, 1940.

A. R. Riley,  
Asst. Purchasing Agent,  
Florence Stove Co.,  
Kankakee, Ill.

This article and others have been reprinted in a 68-page booklet "Shell and Cartridge Manufacture", price \$1.—Ed.

## SALVAGE

Sir:

• In the March 26 issue of THE IRON AGE there is the second installment of an article on "How to Operate Salvage Departments." Could you let me have three clippings of this and the first installment? I should like to pass them on to the salvage committees in our several plants.

T. V. Busk,  
Advertising Manager  
Farrel-Birmingham Co., Inc.,  
Ansonia, Conn.

## AIRCRAFT STEELS

Sir:

• You recently published a table of comparative specifications for aircraft steels. We would appreciate receiving five copies of this for use in our Engineering Department.

R. E. Wiese,  
Fleetwings,  
Bristol, Pa.

## PRICE BOOKLET

Sir:

• In your Feb. 12 issue of THE IRON AGE magazine, you published a separate section entitled "Price Section."

Some one has appropriated to his own use the OPA price ceiling booklet which has proven very helpful to

us. Would you, therefore, please forward me at least one, and if possible, two of the said sections?

M. J. Gurtman,  
A. & J. Friedman Supply Co.,  
Inc.,  
Passaic, N. J.

Copies of the 20-page maximum price booklet are obtainable at 25c each.—Ed.

## PAGING CORPORAL STOLARUK

Sir:

• Am writing this letter and don't know how to word it because I'm quite upset and will come right to the point. Please excuse me.

Hope that you don't feel as bad as I do, but because of prevailing conditions of frequent troop movements I am forced to cancel THE IRON AGE.

At present and for the last several weeks I am at another Camp. Am very fortunate to have your magazine sent to me from Camp Livingston, La.

Cpl. John F. Stolaruk,

Corporal Stolaruk's letter came sans origine. If he sees this, will be please let us know at what address he had been receiving The Iron Age, so the subscription may be stopped.—Ed.

## AIRCRAFT CASTINGS

Sir:

• Could you send me the reprint of your article in THE IRON AGE of Aug. 21, 1941, entitled, "Aircraft Castings." This is the most interesting article on the subject I ever saw and I would like to have it in my files.

S. Behaef, Met. Eng.,  
Cincinnati, Ohio.

## POWDER METALLURGY

Sir:

• One of my clients is interested in the possibilities of powder metallurgy for his production. You would do me a great favor by telling me what articles you have published on the subject and in what issues they have been published since 1935.

Sidney W. Edlund,  
Sidney Edlund & Co.,  
New York, N. Y.

All our major articles on powder metallurgy have been reprinted in a clothbound book of 260 pages (including supplement), entitled "Modern Materials". Price to subscribers is \$2.50.—Ed.

## PRIORITIES, PRICES

Sir:

• We have found considerable use for your special sections on priorities and prices. Several divisions of our company have use for this information. Are additional copies for sale?

Deems W. Hallman,  
Hajoca Corp. Iron Works,  
Lansdale, Pa.

Copies of the 24-page Priority Guide and the 20-page Price Guide are available at 25c each for one to 10 copies; 11 to 100 copies, 20c each; 101 to 300 copies, 18c each; 300 or more, 15c each.



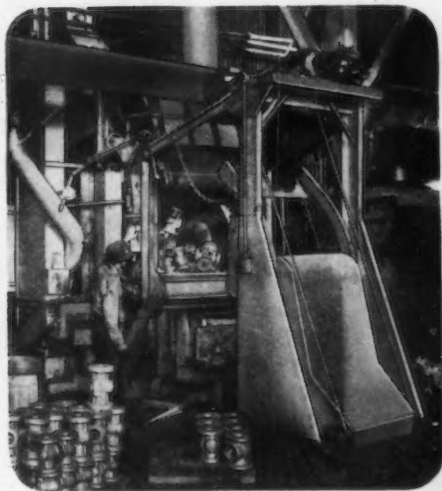
# 3 PROFITABLE WAYS

## TO CLEAN METAL PRODUCTS IN RECORD TIME

**W**HEELABRATOR speed-cleaning is doing its share to speed the day of Victory by saving thousands of hours every day on vital war production jobs—shells, bombs, tank parts, airplane engines, guns and similar products almost without number.

And further savings in time and money accrue by reason of the quality of WHEELABRATOR cleaning: For example, machining and grinding are speeded up; cutting tools last longer; and inspection is handled more rapidly.

When there is a casting cleaning job to be done you can depend upon the WHEELABRATOR to handle it in record time. And there are 3 Profitable Ways to do it, as described in brief on this page.



### TUMBLASTS

WHEELABRATOR TUMBLASTS combine the airless Wheelabrator method of speed-cleaning with the endless conveyor method of tumbling—an exclusive American principle—which completely exposes all surfaces of every piece to the full effect of the abrasive blast.

Tumblasts are built in seven standard sizes ranging from 1 cu. ft. to more than 30 cu. ft. operating load capacity. Automatic loaders can be supplied for all but the very smallest sizes.

These machines are widely used in industry for cleaning castings, forgings, heat-treated work, stampings, etc.



### SPECIAL CABINETS

WHEELABRATOR SPECIAL CABINETS have the distinction of being used for an exceptionally large variety of special cleaning problems. They are designed for handling work where special production requirements prevail; or where the work, due to its size, shape, or weight cannot be adapted to a standard machine, such as cylinder blocks, sanitary ware, etc.

Special Cabinets utilize the WHEELABRATOR in single or multiple units. Special means are used to convey the work through the blasting zone. Certain classes of work are given a rolling, tipping or spinning motion to expose them to the full effect of the blast.



### TABLASTS

WHEELABRATOR TABLASTS are used for cleaning flat or fragile work that is not adapted to tumbling. They are made in two types: The Multi-Tablast and the Plain Tablast.

The Multi-Tablast is recommended for work having high vertical edges or deep pockets. It consists of independent rubber-covered work tables, the number and diameter of which can be varied according to the type and size of work to be cleaned.

The Plain Tablast is suitable for jobbing shops having work that does not have too many pockets and vertical edges.

### Do you know that...

A WHEELABRATOR Tablast is cleaning brass valves and lubricators so thoroughly for a Detroit, Mich., concern that savings exceeding \$10,000 yearly in tool life alone are anticipated.

★  
Heat treat scale from small bearing rings and rollers is being removed in a 15" x 20" WHEELABRATOR Tumbblast in 7 minutes at the Fainir Bearing Co., New Britain, Conn.

★  
A sewing machine company reduced the cost of cleaning heat-treated parts from 30c per cwt. to 7c per cwt. with a WHEELABRATOR Tumbblast.



**AMERICAN**  
FOUNDRY EQUIPMENT CO.

510 S. BYRKIT STREET  
MISHAWAKA, INDIANA

# This Industrial Week . . .

WHEN the flow of war goods from U. S. plants reaches the level where the government is hard pressed to find storing and shipping space, the metal working industry will know that the job set for it is on the way to being done.

This week brought new evidence that the flood is not far off and that within a reasonably short time the emphasis may shift from intensifying manufacture of war implements to speeding transport to battle areas.

War goods are piling up at the docks on both coasts and are backing up at some inland war plants. (It is a mighty "genie of production" that the U. S. Government has called out of its bottle.) For example, 40,000 military trucks are standing at a single East Coast port waiting for ships. At one in-

land plant there are 30,000 combat vehicles ready to be shipped. Thousands of trucks, many of them intended for use in Russia, are being stocked.

Soon the "surplus" of war goods, which involves other factors than ship sinkings, will spread from combat vehicles, in which a tremendous flow might be expected, to other war materials and implements. Already new plants are said to fear that they soon will receive "stop production" orders or "slow" orders.

## Priority Cases Land in Courts

Against the almost daily announcements of new records in production of steel and other vital materials, against the frequent Navy "E" awards to industry for war output accomplishments, must be set the new drive by the War Production Board, assisted by the Department of Justice, on violations of priority regulations. Despite statements by government officials

that President Roosevelt's extraordinary production goals (except for a momentary lag in ships) are being met, a new priority compliance campaign, expected to extend throughout the war industries, is well under way.

First large company to be struck in a series of court actions to "force" compliance with priority regulations covering the distributions of its products is U. S. Steel Corp. The reply of J. L. Perry, president of Carnegie-Illinois Steel Corp. (largest U. S. Steel subsidiary) is as blunt as the WPB claims that his company is guilty of wrong doing.

He said: "The charge that Carnegie-Illinois Steel Corp. diverted to its private customers large quantities of steel urgently required to meet the needs of the armed forces is not true. Carnegie-Illinois is complying fully with priority regulations. In March 99.6 per cent of the company's shipments carried priority ratings." The WPB held that Carnegie-Illinois "has continuously failed to observe the provisions of" priority orders.

(See Page 79 for full text of Mr. Perry's statement and a summary of the WPB-Department of Justice Charges.)

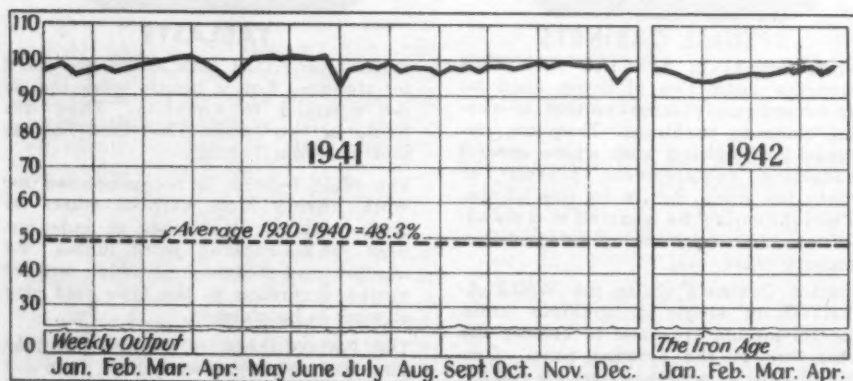
## All Factors Believed Weighed

Since every individual and organization in the U. S. has long been instructed to weigh each act in the light of the question: "Will it help win the war?" industry assumes that the WPB leaders, many of them business men, have weighed all factors and decided that a large scale priorities compliance drive, with court hearings and a publicity campaign, will help defeat the Axis. THE IRON AGE is told that records of scores of companies are to be examined, that 30 investigators are working on a single steel company to find evidence of priority violation.

Meanwhile, the president of one of the steel companies involved in

### Steel Ingot Production—Per Cent of Capacity

(Open Hearth, Bessemer and Electric Ingots)



### Steel Ingot Production, by Districts—Per Cent of Capacity

	Pitts- burgh	Chi- cago	Youngs- town	Phila- delphia	Cleve- land	Buf- falo	Wheel- ing	De- troit	South Ohio	West	St. Louis	East	Aggre- gate	Insti- tute
Last Week.	99.0	105.0	99.0	91.0	93.0	104.5	83.0	99.0	102.0	100.0	97.0	95.0	105.0	98.0
This Week.	99.0	104.5	101.0	91.0	95.0	106.5	83.0	95.0	102.0	104.0	97.0	103.0	112.0	99.0



the priorities drive found himself with a Navy telegram of praise for his war efforts in one hand and a summons from the Department of Justice in the other. He could say, with justification, "C'est le guerre."

Other WPB priority inquiries almost completed concern iron and steel scrap, pig iron, aluminum, copper, chromium and nickel.

Almost at the same time, the OPA has launched a similar drive against violators of price ceilings. "We are not going to tolerate violations under any circumstances," Price Administrator Henderson said. "Those who fail to comply with the price regulations are subject to criminal penalties."

### Ultimate Use Governs Rating

For months the War Production Board has been removing the opportunities for any substantial diversion of steel or other vital materials to non-war uses by a series of orders shutting off civilian production of durable goods.

More and more the WPB is insisting that the ultimate use of each pound of steel or other needed material be fully established as helpful to the war program. A complete survey of the anticipated use of metals for the third quarter of 1942 has just been ordered by WPB. Questionnaires will be mailed to all American users of metal in raw or semifabricated form and are to be returned to the Bureau of the Census by May 15.

And, more and more, industry is being forced to gain a complete understanding of the wartime controls which, almost hourly, are being clamped on some segment of the metal industry. One priority development this week is the announcement Monday by J. S. Knowlson, director of industry operations, that granting of preference ratings on individual applications for material to be used in general manufacturing operations will definitely be discontinued. This action is another step toward putting American industry under the Production Requirements Plan.

(Under this plan, the producers file a single application to cover all their requirements for materials during a calendar quarter, or for the remainder of a calendar quarter when the application is filed in an interim period. No individual application from a manu-

facturer for materials to be incorporated into his products over a period of more than one month is being approved by WPB.)

Complete allocation of machine tools now seems likely to go into effect before July 1, according to a "stamp" plan now being drawn by the WPB. The new system, which

*For latest developments in WPB Priority Regulations, see page 102. Turn to page 109 for latest news of war industry price controls.*

will set aside the present priority control and the numerical urgency rating list, will be issued by WPB for every machine tool now on order. After the effective date, a buyer must obtain a stamp from one of three issuing authorities before an order can be given to a machine tool builder for a machine.

While the WPB will control issuance of the machine tool stamps, allocation of stamps will be in the hands of (1) The Army and Navy Munitions Board, representing the armed forces and the Maritime Commission; (2) The lend-lease authority, representing foreign buyers, including Great Britain, the Dominions, Russia and China, and (3) The WPB itself, which will handle distribution of stamps to strategic machinery manufacturers like those producing equipment for butyl rubber, high octane gasoline and explosives production.

(See page 106 for complete details on the machine tool stamp plan).

### Steel Output Rebounds

This week steel production in the U. S., according to IRON AGE estimates, rebounded a point to 99 per cent of capacity, equalling, in annual tonnage, the all time high of two weeks ago. For the most part, the recovery was the result of return to operation of furnaces that have been off for repairs. Scrap is moving more freely than in many months, although constant pressure is required to keep sufficient quantities going into the plants. Allocations and spring weather are factors in this improvement. Producers in one area have been getting a little more scrap than they are using, permitting, in this one case, the accumulation of a small stock.

Steel production by districts shows Chicago down a half point to 104.5 per cent and Birmingham off four points to 95 per cent. Slightly stronger schedules were reported by Youngstown, up two points to 101 per cent, Cleveland, a point and a half to 94.5 per cent, and Buffalo, two points to 106.5 per cent. St. Louis is eight points higher at 103 per cent while the Southern Ohio River area has advanced four points to 104 per cent, and the Eastern District has risen seven points to 112 per cent. Pittsburgh ingot output is unchanged at 99 per cent, the average for the nation as a whole, and Wheeling at 83 per cent, Philadelphia at 91 per cent and the Western District at 97 per cent show no change from last week.

### Action Taken By OPA on Scrap

Latest development in the scrap market is court action against two steel companies, a broker and 24 dealers in an effort by OPA to insure an "orderly" market. Bright spots in the scrap supply picture are the planned addition of two openhearth to the active list at an Ohio steel plant, an increase in slag dump "mining" operations and invaluable contributions from public scrap drives such as that at Buffalo where 65,000 tons are reported uncovered.

The scrap shortage should be relieved by next December with the aid of increased blast furnace output, C. M. White, Republic Steel Corp. vice president, said this week at Cleveland. He estimated that the steel industry is now 3,100,000 net tons short of having enough scrap.

Meanwhile the situation with respect to turbo blowers for use in blast furnace construction has become increasingly serious, due to inability to obtain sufficient alloy steel to go into production of the blowers. Government action to get material for turbo blower manufacturers might prevent delay in the blast furnace program. The alloy situation is in turn bottlenecked by the inadequacy of heat treating facilities with manufacturers of heat-treating furnaces bogged down by orders.

Two new war plants will use wooden trusses instead of steel while two others will use concrete pillars because of diversion of steel to more vital uses.



★ Save time, save materials—those are your marching orders today. Let Allegheny Stainless Castings help you. They're produced from steel melted in unique hollow-electrode furnaces, which permit closer-than-ordinary control of alloying conditions and purity.

*Result:* these castings are highly uniform in analysis and dense in structure. They're easy to machine and weld, and they assure a step-up in production and less spoilage.

But don't overlook a further factor. Where you can replace forgings with castings, even greater savings can be made—both in machining time and in raw materials, since there is much less steel to cut away.

Our Technical Staff is at your disposal on casting problems involving any stainless grade, any design, and any weight—from pounds to a ton and more. Meanwhile, *mail the coupon below* for data on Allegheny Stainless Castings.

**ALLEGHENY LUDLUM**

STEEL CORPORATION

PITTSBURGH, PA.

*Branch Offices in*



*Principal Cities*

Allegheny Ludlum Steel Corporation  
Pittsburgh, Penna.

Send me a copy of your Stainless Castings Bulletin.

NAME \_\_\_\_\_

COMPANY \_\_\_\_\_

ADDRESS \_\_\_\_\_

T-222



## WPB Claims Steel Companies Violate Priority Provisions

Washington

• • • Singling out the steel industry as its first object of attack, the suits filed Monday by the Department of Justice against the Carnegie-Illinois Steel Corp. and the Jones & Laughlin Steel Corp. for alleged violation of WPB priorities are said to be only the forerunners of similar action against not only other steel makers but also against other industries.

There is speculation regarding what constructive achievements might result from these suits. For, it is pointed out, there will be no civilian use of steel after June 30. The forthcoming WPB durable goods orders will prohibit such use of steel.

Some WPB iron and steel branch officials say that most violations, which the board alleges, occurred before Jan. 1. Since the second war powers act only became a law on March 27 its penal provisions could not be invoked for violations prior to that date.

In its statement released on Monday morning that bills of complaint had been turned over to the Department of Justice, WPB's Division of Industry Operations said that the actions were the first announced results of an (steel) industry-wide survey conducted by WPB's compliance branch with the assistance of Federal Trade Commission.

This investigation was begun several months ago and an FTC report, said to allege "wholesale violations," was returned to the board but it has never been made public. As the WPB points out, surveys of compliance within the industry are "still in process." It is said that investigations now are being made at plants of eastern steel manufacturers and that after the steel industry has been brought under government scrutiny other large industries will be brought to task for alleged violations of priorities.

The suits seek injunctions to:

1. Enjoin the two steel com-

# News of Industry

• • •

panies from "accepting, holding, using, producing, manufacturing, distributing, delivering or dealing with or in" iron, steel, or iron or steel alloy products, or from filling, accepting, or delivering orders for such products or operating their plants and mills "otherwise than in accordance with" War Production Board regulations and orders.

2. Command the two steel companies to comply with all provisions of WPB's regulations and orders.

The suits charge that unless the steel companies are so enjoined, their continued failure to comply with such regulations and orders will make impossible effective and orderly administration of the WPB's program "to the detriment of maximum efficiency in the prosecution of the war."

Both suits charge "unless defendant is immediately restrained from continuing to violate said regulation and order and is immediately compelled to observe and comply with all of the provisions thereof, and with the provisions of specifications and directives, other producers, manufacturers, and distributors of steel, iron, alloy steel, alloy iron and products therefore will be encouraged or will consider themselves to be compelled by economic necessity to refuse to comply with and observe said regulation and

(Concluded on Page 82)

## Charges Are False, Says Perry, Pointing To Company Record

Pittsburgh

• • • J. L. Perry, president of Carnegie-Illinois Steel Corp., issued the following statement April 19:

"The charge that Carnegie-Illinois Steel Corp. diverted to its private customers large quantities of steel urgently required to meet the needs of the armed forces is not true. Carnegie-Illinois is complying fully with priority regulations. In March, 99.6 per cent of the company's shipments carried priority ratings.

"Today's action of the War Production Board comes as a complete surprise to the company. The company's compliance with regard to priorities and its record-breaking production of high rated tonnages of steel have been the means of accelerating the programs of the Army, Navy, Maritime Commission and Lend-Lease, and have received favorable comments from these sources and from WPB itself.

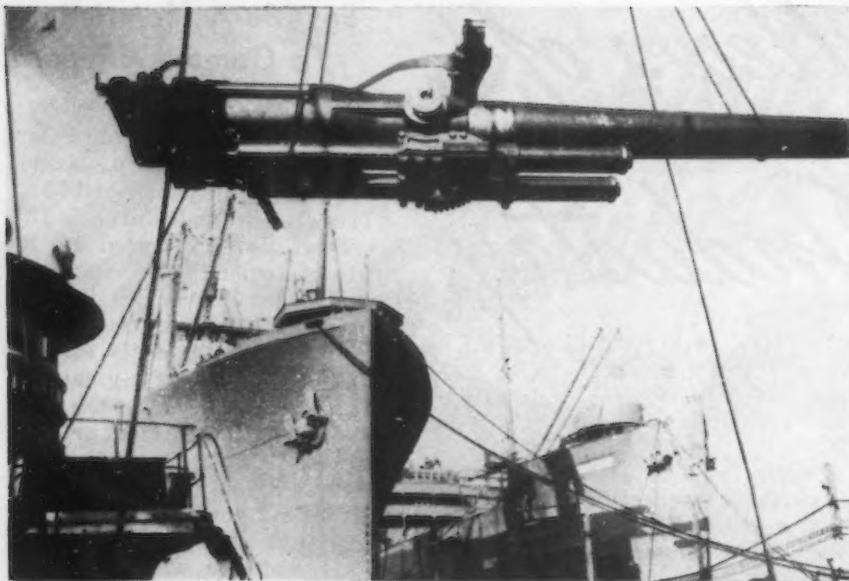
"The fixed purpose of this company has been one of literal compliance at all times with allocation, priority orders and special directives. It has issued a manual to its employees, after many conferences with WPB, which has attempted to interpret the various and frequently conflicting orders of those charged with issuing priorities. The only purpose of this manual is to try to keep the company's procedures up to date in the face of a mass of changing regulations.

"The best interest of the country has been and is the sole motive governing Carnegie-Illinois Steel Corp. in its solution of the tremendous problems confronting our mills in maintaining the flow of the greatest tonnage of steel ever produced, and any charge of deliberate or willful violation of priorities is entirely unfounded.

"To name this company as giving preference to customers of its choice without regard to war needs or preference ratings is a statement

## MAP OF JAPAN'S BIG WAR PLANTS

- See next week's IRON AGE—the April 30 issue—for your copy
- of a 40-in. map, in color, showing locations of Japan's steel,
- aluminum, machine tool and airplane plants, its shipyards,
- powder plants and arsenals.

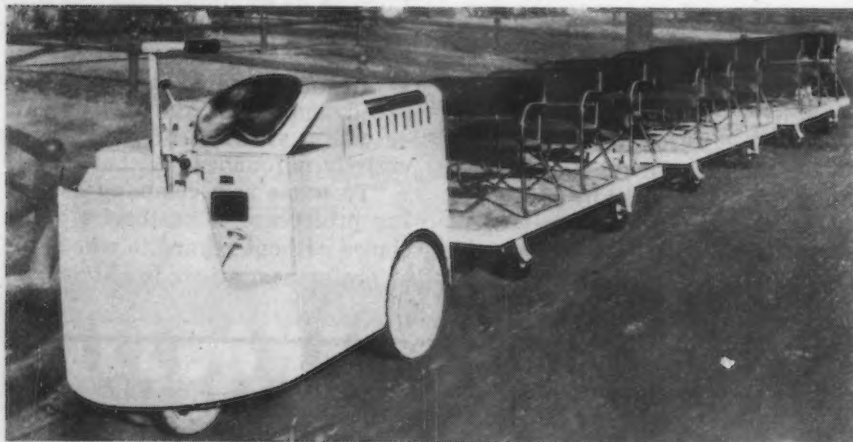


AP Photo

**NEW CARGO INSURANCE:** To put a "punch" into merchant shipping, these vessels are being armed at an American port. Here is a large gun being swung on board for dealing with enemy subs.



**INCENDIARY BOMB PLANT:** Each of the little metal knobs represents an incendiary bomb, destined for the Axis. Fisher Body Co. machines these parts by the thousands.



**PERSONNEL TRANSPORTATION:** With the building of new plants that cover acres of ground, transportation of personnel and visitors has become difficult. This Mercury electric "tug" with specially designed trailers is one answer to the problem.

absolutely without foundation. Production and deliveries of highly rated tonnages have received the very closest attention which this company has been able to give them, and its facilities and mills have been used to the fullest extent in furtherance of the war effort.

"Reference is made in the statement to plate deliveries in accordance with priority procedures. Despite conflicting requirements and specifications which in the past have limited production, this company is proud of its plate production record which increased from approximately 1,360,000 tons in 1940 to two million tons in 1941 and is now at the current annual rate of 3,600,000 tons—almost three times the 1940 rate. This record was made by using new equipment and by taxing old facilities to the utmost, and accounts for about 40 per cent of the plate produced by the entire industry.

"Those in WPB who are familiar with the facts know that as soon as its predecessor, OPM, was sufficiently organized to review plate mill schedules, those schedules were submitted for such review and were adhered to under OPM and later WPB direction. Thus WPB was in control of the distribution of plates between ship builders and other consumers.

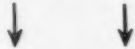
"This company has a record second to none in fulfilling this country's war needs and has borne the major burden of supplying ingots and semi-finished steel to Great Britain under the Government's lend-lease program. This tonnage bore the highest priority rating.

"It is difficult for anyone who is not fully familiar with the production of steel to understand the intricate scheduling procedure involved. The type of product, the chemistry, the specifications as to size, the physical properties and other essential characteristics that are required to be coordinated as to the period of manufacture and with the capacities of the hundreds of different mills that produce these products in Carnegie-Illinois is a complicated problem. It required the WPB months to understand this situation and adapt their priority procedure to it in order that the mills might have a practical manufacturing schedule.

"Carnegie-Illinois Steel Corp. is working at top speed to supply vital



war necessities of the country. It will nevertheless gladly appear and demonstrate its full compliance with all governmental regulations if those in charge of this investigation feel that the best interests of the nation's war effort can be served by a proceeding of this character at this time."



### Navy Praises J. & L. As Priority Suit Is Filed *Pittsburgh*

••• H. E. Lewis, president of Jones & Laughlin Steel Corp., stated that he was surprised at the statement originating from the offices of the WPB.

Mr. Lewis further stated that Jones & Laughlin Steel Corp. through its officers and employees had been in daily contact with the various agencies of the government and the latter were thoroughly familiar with the corporation's scheduling of steel products.

"In March, 1942," said Mr. Lewis, "priority shipments of our corporation were 94.8 per cent and in April, 1942, to date, priority shipments were 99.8 per cent of our total shipments, most of which represents the requirements of the Army, Navy, Maritime Commission and lend-lease customers."

"Nothing is being left undone by our employees and management to do our utmost in the present crisis and we are and have been breaking records repeatedly in our all-out war effort."

Shortly after the action against J. & L. was filed, the company released a message received from James V. Forrestal, under-secretary of the Navy. It read, "Team work greatly appreciated. Continuance of this record vital to war requirements."



### Eleven Inquiries by WPB Now Being Conducted *Washington*

••• Covering a wide range of metal products, the WPB drive against alleged violations of priorities involves 11 inquiries, with nine



**ROLLING GUN REPAIR SHOPS:** Army guns in action need constant attention and repair, and to eliminate shipping them to central repair stations, the army uses a railroad car equipped like a machine shop. Power generators and a full complement of tools make it possible to repair any gun.



*Harris & Ewing Photo*

**FUZE BODIES:** Mass production of fuze bodies is performed on this machine in an Army Ordnance arsenal and plants on army contracts. Aluminum bar stock is fed into the machine.

almost completed, while OPA simultaneously has started concerted action against violations of scrap price ceilings, as reported in the scrap market of this issue on page 118.

The 11 investigations by WPB involve 9569 firms. In addition it is said that it is about to make an inquiry in the steel warehouse industry. Violations of varying degree are charged.

Of the nine inquiries about completed several relate to steel producers. Others almost finished relate to iron and steel scrap allocations, pig iron consumers, aluminum, copper producers, copper fabricators, copper foundries and chromium and nickel.

### **WPB's Claims Against Two Steel Companies**

*(Continued from page 79)*

orders, the Government of the United States and the WPB will be unable to conserve the supply and direct the distribution of such materials and material products in the public interest and to promote the defense of the United States, the declared policy of Congress will be defeated, and plaintiff will suffer irreparable injury."

The suit against Carnegie-Illinois Steel Corp. charges specifically:

1. That the company, on or about June 20, 1941, and Aug. 23, 1941, "in disregard" of WPB regulations and "incompatible and at variance with them" issued various instructions and directions to its officers and employees with respect to handling orders from customers, giving preference in production and delivery "on the basis of their—the customers—past purchases from the company" regardless of the WPB priority rating orders.

2. That the (C-I) company, on or about Aug. 23, 1941, issued manuals setting up standards for scheduling and producing orders, whereby orders were to be selected "by giving consideration to each of the following factors in the sequence shown"—

a. The rolling program of each mill or plant.

b. The allotment schedule of each mill or plant.

c. The preference list prepared by each district sales office.

d. The WPB priority rating of the order.

e. The requirement date of the order.

f. The entry date of the order.

"Violations from allotments on a week to week basis" the manual added, according to the suit, "may be made provided that such violations are justified from mill conditions and/or customers relations standpoint."

The suit charges that the "preference list referred to (above) as the third most important consideration in the scheduling of orders is a preference list made up by defendant's customers or district sales offices" and that "such lists have nothing to do with the priorities and preference rating system" established by the WPB.

Both suits charged that since May 31, 1941, and since establishment of the WPB allotment system, the company continuously failed and declined to observe the WPB regulation for handling orders by:

A. Delaying delivery of high priority rated orders in favor of orders bearing lower priority ratings or no rating at all.

B. Delaying production and delivery of allocated steel products, including steel plates, by giving preference to orders not directed to be produced by WPB, "contrary to the expressed direction" of WPB officials.

C. Failing to utilize facilities of its plants and productive capacity to secure maximum production of orders bearing high preference or priority ratings and

D. Allotting, "in an arbitrary manner, without regard to the necessity of overall compliance" orders and supplies of material.

The suit against Carnegie-Illinois also charges that on or about Feb. 9, 1942, following a preliminary investigation by the government to determine whether the company was complying with WPB regulations, the company altered and revised its manual and method of handling orders, but continued to violate and is still violating WPB regulations and orders.

In the suit against Jones & Laughlin, it is specifically charged

1. That the company during January, 1942, made deliveries, 41.4 per cent of which by tonnage were on orders bearing preference ratings of A9 or lower and 18.7 per cent of which by tonnage were

orders bearing no preference rating whatsoever.

2. That the company, during February, 1942, made deliveries, 31.3 per cent of which by tonnage were on orders bearing preference ratings of A-9 or lower, and 9.4 per cent of which by tonnage were on orders bearing no preference rating whatsoever.

3. That the company from March 1 to 14, 1942, inclusive, made deliveries 23.9 per cent of which by tonnage were on orders bearing preference ratings of A-9 or lower, and 9.5 per cent of which by tonnage were on orders bearing no preference rating whatsoever.

The suit charges that these deliveries were made at a time when the company had a large backlog of unfilled orders bearing a preference rating of A-8 or higher, and when the company was deferring production and delivery or was failing to produce or deliver products under such backlog orders which called for delivery during that time.

4. That the company during February, 1942, in violation of general allocation order No. 1 delivered a total of over 1500 tons of steel plates without WPB authority or approval, a large percentage of which was delivered to its own warehouses.

5. That the company, from Feb. 25 to March 31, 1942, produced 570,000 ft. of "oil country casing"—that 7 in. in steel pipe made of high quality steel—of which only 70,680 ft. or 12 per cent, was delivered on orders bearing a preference rating and 499,320 ft. or 88 per cent was produced on orders bearing no preference rating whatsoever.

The suit charges that on Feb. 21, 1942, the company received WPB orders not to ship such pipe after March 14, 1942, except on orders with a preference rating of A-9 or higher and then only under certain conditions, that production of this pipe is "a very profitable operation for defendant" and that the company had not produced such pipe since early October, 1941, but immediately began production with the receipt of the Feb. 21 WPB order "in order to secure as much profit as possible out of the production of such prior to the taking effect" of the order.

6. That the company, during January and February, 1941, despite a large backlog of unfilled orders with high preference rat-



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• SCREWS WITH LOCK WASHERS

U. S. Patents on Product and Methods Nos. 2,046,343; 2,046,837; 2,046,839; 2,046,840; 2,082,085; 2,084,078; 2,084,079; 2,090,338. Other Domestic and Foreign Patents Allowed and Pending.

American Screw Co., Providence, R. I.  
The Bristol Co., Waterbury, Conn.  
Central Screw Co., Chicago, Ill.  
Chandler Products Corp., Cleveland, Ohio  
Continental Screw Co., New Bedford, Mass.  
The Corbin Screw Co., New Britain, Conn.  
International Screw Co., Detroit, Mich.  
The Lamson & Sessions Co., Cleveland, Ohio  
The National Screw & Mfg. Co., Cleveland, Ohio

New England Screw Co., Keene, N.H.  
The Charles Parker Co., Meriden, Conn.  
Parker-Kalon Corp., New York, N.Y.  
Pawtucket Screw Co., Pawtucket, R.I.  
Pheoll Manufacturing Co., Chicago, Ill.  
Russell, Burdall & Ward Bolt & Nut Co., Port Chester, N.Y.  
Scovill Manufacturing Co., Waterbury, Conn.  
Shakeproof Inc., Chicago, Ill.  
The Southington Hardware Mfg. Co., Southington, Conn.  
Whitney Screw Corp., Nashua, N.H.

ings for such products delivered a. 8873 tons of steel sheets and strip under order bearing no preference rating whatsoever.

b. 996 tons of wire rods and 3698 tons of wire products under orders bearing no preference rating whatsoever, and 9745 tons of wire rods and products to warehouses, including its own, under orders bearing A-9 preference ratings.

c. 5574 tons of steel shapes and bars under orders bearing no preference rating whatsoever and 20,538 tons of such products under orders bearing A-9 and A-10 ratings, and 558 tons under orders bearing a "B" rating, "although the condition of its backlog on such orders for steel bars became critical on Feb. 1, 1942."

The government claimed that the company, during January and February, 1942 delayed and deferred production of steel shapes and bars under orders bearing preference ratings of A-3 or higher, including an order for a U. S. Pacific naval air base—A-1-I rating—and orders for the Brooklyn and Norfolk Navy Yards—A-1-B—and the Springfield, Mass., armory—A-1-I rating.

The cases are being handled for the Dept. of Justice by Edward H. Miller, special assistant to the attorney general, under the supervision of assistant attorney general Thurman Arnold.

## Army 'Buried' with Material, Engineers Told

*Detroit*

• • • Although still far from peak production, war plants are burying the armed forces under a flood of material according to C. C. Carlton, vice president and secretary of Motor Wheel Corp., and chairman of the Automobile Parts Advisory Committee, WPB, speaking at 62nd annual convention of the Michigan Engineering Society at Lansing.

He said that 40,000 military trucks are waiting at an East coast port for transport overseas and that thousands of others are stored elsewhere.

An army officer at the same meeting revealed that the present rate of enlistments in the air corps would supply less than one-quarter the pilots needed for bombers shortly to come from Ford Motor Co.'s Willow Run plant.





Harris &amp; Ewing Photo

**RUBBER "CZAR":** Arthur B. Hewhall, former B. F. Goodrich Co., vice president, has been named co-ordinator of rubber for WPB. He will have full charge of rubber production and distribution.

### Farm Machinery Branch Of WPB Reorganized

Washington

••• The WPB farm machinery and equipment branch set up four sections to handle problems relating to products formerly handled by the branch in general. These four sections are:

Tractor and Farm Engine Section, Harvesting and Marketing Equipment Section, Tillage, Planting, and Seeding Equipment Section and Barn, Poultry, and Miscellaneous Equipment Section.

These sections will handle all appeals under limitation order L-26. Appeals should be sent to the section in control of the equipment covered by the appeal, addressed to the War Production Board, Ref. L-26, and marked for the attention of the section chief handling the equipment involved.

### Pipe & Tube Products Co. Gets Tract and Buildings

••• Pipe & Tube Products Co., Jersey City, N. J., has acquired a 10½-acre tract including buildings, at Ford City, Pa., in order to expand its facilities for the production of cold drawn seamless steel tubes.

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High Carbon  
Fine Wire

Tempered, Polished and  
Blued High Carbon  
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TO YOUR PLANT'S  
VICTORY  
PROGRAM?

**Production for Offense** involves many a problem, not the least of which may be your requirements of special round, flat or shaped wires to exacting standards of steel analysis, dimensions and finish. Gain time by letting Roebling solve these problems for you . . . delivering the right wire . . . to the right standards . . . on schedule.

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2. Hyatt Roller Bearings and Ball Bearing Motor.
3. Safety upper stop; lower blocks; sure brakes.
4. Two-gear reduction drive; sealed against oil leaks; steel interchangeable suspension.

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## Georgia-Texas Oil Line Turned Down

Washington

... Because of "imperative steel requirements of the war efforts," Joseph B. Eastman, director of Defense Transportation, has refused to approve the construction of the proposed DPC financed 1050-mile crude oil pipe line from Wichita County, Texas, to Savannah, Ga. The line, it was estimated, would call for about 85,000 net tons of steel, would cost \$25,000,000 and would have daily capacity of 70,000 barrels of oil. From the point of origin to the eastern border of Texas, approximately 300 miles, the line would be constructed of 10¾-in. pipe. The remainder, extending to Atlantic coastal areas, would be 12¾-in. pipe.

Eastman said there was no showing that the necessary pipe, pumps and other materials are available under present conditions. Neither the Army nor the Navy supported the project, he said. The War Department actively opposed construction of the line.

**WAR WORKERS HEAR ARMY CHIEF:** General Brehon Somervell, the army supply chief, in a tour of war plants in the New York area warned workers that the lives of American soldiers may hang on minutes wasted in the race of production.

*International News Photo*







British-Combine Photo

**RUSSIAN MUNITIONS:** Daily output of supplies for the front are being stepped up in Russian factories. In this Leningrad plant can be seen a pile of big ones that will be delivered soon to the Nazis, from the Soviet guns.

### Office Space Expanded By Arthur G. McKee Co.

Cleveland

••• Pressure of foreign and domestic contracts have forced Arthur G. McKee & Co., engineers and contractors, to expand office facilities. In 1941 total dollar volume of new business was 82 per cent higher than in 1940. Earnings before income and excess profits taxes were \$1,817,332 in 1941 but after taxes net income amounted to \$718,238.

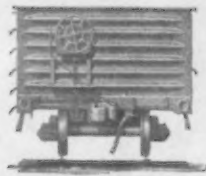
### Higgins Buys Tucker Aircraft

Detroit

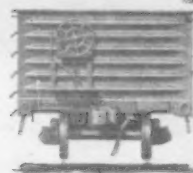
••• Higgins Industries, Inc., New Orleans, has taken over the Tucker Aircraft Co., Detroit, and announces that a program of airplane and boat armament production will be started. Andrew Higgins is president of the company and Preston Tucker, head of the Detroit company, will become vice-president in charge of the Tucker-Higgins division.



Cross-section below shows extra heavy construction and uniform size product. Rectangular cross-section screen bars of high carbon steel, riveted in sections. Flex-teeth maintained in outer or crushing position by centrifugal force.



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### Gear Makers' Meeting To Start on Sunday

• • • Because of the fact that all of its members are extremely busy and that time is at a premium, the American Gear Manufacturers' Association is planning to start its 26th annual meeting on Sunday, rather than on a Monday as has been the customary practice. The meeting dates have been switched from May 11, 12 and 13 to May 10, 11 and 12. Individual committee meetings will begin on Saturday, May 9. The meeting will be held at the Hotel Hershey, Hershey, Pa.

The first general meeting on Sunday afternoon will be addressed by W. P. Schmitter, president of the association and chief engineer of the Falk Corp. This will be followed by reports of various administrative committees and by separate meetings of commercial and technical committees.

Among the formal papers to be presented on Monday and Tuesday are an address on "Physics of Metal Cutting" by Dr. E. M. Martelotti, Cincinnati Milling Machine Co.; "Gear Production by the Hobbing Process" by Louis W. Falk, of the Falk Corp.; "Cutting Gears and Other Parts with a Reciprocating Tool" by George H. Sanborn, Fellows Gear Shaper Co., and a talk on "Cutting Gears in Farrel-Sykes Gear Generators" by Harry E. Kitchen of Farrel-Birmingham Co. The guest speaker at the Monday evening informal dinner will be Dr. Lillian M. Gilbreth, who will speak on "Skills and Satisfaction."

Much of the time will be devoted to a reorientation of committee activities, both commercial and technical, and a number of recommended practices will be voted upon.

### Detroit ASM Hears Talk on Transformation of Austenite *Detroit*

• • • An address, "Transformation of Austenite" was given in Detroit on April 13 by E. S. Davenport, metallurgist, research laboratories, United States Steel Corp., Kearny, N. J., before members of the Detroit Chapter of the American Society for Metals. A technicolor film, "The Airacobra" by Bell Aircraft Corp., Buffalo, was also presented.



## Employee Absences Worrying Committees

Cleveland

• • • One of the worries of the newly formed labor-management committees at Cleveland Pneumatic Tool Co. and at National Malleable & Steel Castings Co. is "absenteeism." Apparently employee absences recur most frequently on Mondays and Fridays. The committee at National Malleable plans to assign one of its members to cooperate with foremen in conferring with absentees. In addition, the company will send letters to absentees, impressing them with the need for continuous work.

## Tool Engineers Charter 54th Chapter at Louisville

• • • The 54th chapter of the American Society of Tool Engineers was chartered at Louisville last month, with 64 members in the group. Kenneth C. Jasper, tool supervisor, Westinghouse Ordnance Division, Louisville, was elected chairman of the chapter and Frederick Brown, president, Talking-Weighing Machine Co., first vice-chairman. Other officers elected were: Fred W. Fieldhouse, president, Fieldhouse Engineering Corp., second vice-chairman; John Thomas, general foreman, gun erection department, Westinghouse Ordnance Division, treasurer, and Sauter F. Reichert, foreman of brass tool department, American Radiator & Standard Sanitary Corp., secretary.

## Scrap from Slag Lecture Given Detroit Engineers

Detroit

• • • The processes and methods used in the recovery and preparation of steel scrap from steel-making furnace slags and refuse were described before members of the Detroit District Section of the Association of Iron & Steel Engineers on April 14 by Fred E. Ullman, of the Hockett Corp., Butler, Pa. A technicolor motion picture showing the dismantling of the old "B" Blast Furnace and the erection of the new "B" furnace at the Zug Island plant of Great Lakes Steel Corp. was presented by Julius A. Clauss, chief engineer of the corporation.

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Outline your "all-out" production problem to Thomas engineers who have had broad experience, and who will be glad to assist you.

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ELECTRO COATED WITH  
NICKEL, ZINC, COPPER,  
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There is an American chain for every requirement and with it the correct accessories—from S-hooks to Grab Hooks and Slip Hooks which are used on Sling Chains and other heavy duty chains. To get the best service from chains use the right fittings and attachments. Please write if you have any questions.

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### Eight Who Repaired Active Furnace Win High Praise

Middletown, Ohio

• • • Eight men of the Hamilton plant of American Rolling Mill Co. last week repaired the vortex of the No. 1 furnace there while the structure was still producing pig iron. They came through without an injury or production delay. Three days were spent in planning the job to insure the safety of the men who would be working on the vortex.

Col. A. Robert Ginsburgh of the War Department recognized the bravery and skill involved in the blast furnace repair job. He wrote each of the men involved, as follows: "Congratulations on your part in keeping war production going. With eight other men, you found a way to make repairs on your No. 1 blast furnace without interrupting the flow of vital pig iron. Nothing can stop America so long as she has soldiers of production like you. Keep up the fine work."

### Drop Forging Industry Meeting War Demands

Cleveland

• • • Adjustment of the production facilities of the drop forging industry to all-out production for armaments and equipment with which to make armaments was well under way months before the war was declared, according to the Drop Forging Association. Despite shortages of skilled labor, common throughout the metal working industry, the drop forging industry increased the output of forgings in 1941 to double the total production for the year 1940. During the first three months of 1942, every unit of the industry was producing at a faster rate and in much greater volume than for the same months of 1941.

### R. F. Sentner Appointed Head of Tin Plate Unit

• • • Richard F. Sentner of Wheeling has been appointed head of the tin plate unit of the WPB Iron and Steel Branch, C. E. Adams, branch chief, announced April 15.

Mr. Sentner has been manager of tin plate sales of Wheeling Steel Corp. since 1940 and has been associated with the sales department of that company for 16 years.





International News Photo

**MINUTE EMERGENCY AUTO WHEEL:** This emergency automobile wheel is to replace flat tires, saving them from destruction while riding flat. The emergency wheel needs no jack or tools, and is only a temporary substitute for a tire to get the car to a garage.

### \$20 Million Plant Approved To Process Cuban Nickel Ore

••• Large deposits of low grade nickel ores from northeastern Cuba are to be treated to yield the badly needed metal for armor plate and other tough steels required for war production, William L. Batt, WPB director of materials, has announced. Processing will be done by the Nicaro Nickel Co., a new subsidiary of the Freeport Sulphur Co., which through another subsidiary also produces manganese in Cuba. Since 1940, the company has conducted research on nickel recovery. Its results were recently approved by a government technical committee, and a \$20,000,000 plant authorized.

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### Beehive Coke Will Supply Two Large New Furnaces *Pittsburgh*

••• Two giant blast furnaces now being constructed with DPC funds and to be operated by Carnegie-Illinois Steel Corp. in the Pittsburgh district will be supplied with beehive coke from the Connellsville regions for pig iron production. Recently the H. C. Frick Coke Co., subsidiary of U. S.

Steel Corp., arranged for extensive rehabilitation of coal fields in the Leisenring area near Connellsville, Pa., as well as fields in Greene County. Both of these fields will be capable of producing a total of 30,000 tons of coal daily, part of which will go to the Clairton by-product plant of Carnegie-Illinois and part of which will be sent to beehive coke ovens now being reconstructed in the Uniontown area.

## It measures up or it's mustered out

... Fortunately for you, our testers have no pity. Certain springs, such as these we make for an electrical equipment manufacturer, require 100% load testing—each individual spring checked against specifications. There's a hitch to it. Accurate testing must run in the same race with mass production, for speed today is the essence of all orders. To make

100% testing practical Hunter had to develop its own line of testers. Principal features are an amazingly true-sliding bearing to prevent wobble, and ultra high frequency vibration to eliminate frictional drag effects on gauge readings. The Hunter spring tester is heartlessly impartial, accurate, fast... shows you once again that there is much more to spring making than just winding a "hunk of wire."



**HUNTER**  
*Science in Springs*

HUNTER PRESSED STEEL COMPANY, LANSDALE, PENNSYLVANIA

### Calls 17-Hr. Strike A "Patriotic Walkout"

*Cleveland*

••• The effort of union leaders to refer to work stoppages as anything else but a "strike" was fittingly climaxed here, when Stanley Chmielewski, chairman of an A.F.L. grievance committee, called a 17-hour strike a "patriotic walkout," because striking employees wanted the U. S. Navy to take over the Crucible Steel Casting Co. plant, which has been turning out vital munitions material. Called in the midst of company negotiations of union demands for a \$1-a-day wage increase, a closed shop, a 10-minute "wash-up" allowance before the end of shifts, and "better working conditions," the strike was largely blamed on company foremen for "riding us, pushing, pushing all of the time," according to Chmielewski. U. S. Conciliator Dan Hurley got the men back to work after arranging for submission of union demands to conciliators within a few days.

### 521 Broken Records Since Pearl Harbor Celebrated

*Ashland, Ky.*

••• Mill whistles were tied down at 7:30 a.m., April 14, at the Ashland division of American Rolling Mill Co. At that minute the 521st record since Pearl Harbor was established. This total exceeds the number of records set by the plant during the entire year preceding the outbreak of war. Covering both maintenance and production, every department at Ashland Armco contributed to the achievement.

### T.C.I. Makes Output Records *Birmingham*

••• New tonnage records were established during March at the Tennessee Coal, Iron & Railroad Co.'s Ensley Works and Fairfield Steel Works, and the Bessemer Rolling Mill. At Fairfield, new records were made at the by-product coke department, the open hearth department and the plate mill; and at Ensley at the No. 2 blast furnace, the 44-inch blooming mill and the 34-inch billet mill. Bessemer Rolling Mill's 16-inch bar mill established a new tonnage mark. Production of shell forgings is also about 40 days ahead of schedule.



# AJAX FORGING PRESSES

## with *Direct-Acting Air Clutch*

Provide range of operating speeds essential to uniform forgings and long die life



13C-AJAX Standard Speed FORGING PRESS



20C-AJAX High Speed FORGING PRESS

UNQUESTIONABLY, proper speed of operation is a most essential factor in producing press forgings that are uniform in size and metallurgical properties, and for realizing maximum die life for forging being produced. When operating speeds are too low, excessive transfer of heat from the stock to the dies causes excessive die wear, while chilling of the stock interferes with its flow and the proper filling of the die impressions. Since the constant ram travel brings the dies fully closed at each stroke, if operating speeds are too high, excessively rapid metal flow across the die surfaces, particularly on extrusion forging, produces abrasion on die surfaces that materially shortens die life. These and other obstacles to the production of accurate uniform forgings and satisfactory die life are eliminated by AJAX Standard and High Speed Forging Presses with Direct-Acting Air Clutch which

covers the whole range of desirable operating speeds. From the standpoint of speedier production, the smooth cushioned starting at speeds far exceeding past limits makes possible completion of several operations such as fullering, roughing and finishing, without reheating. Furthermore the instantaneous response of the AJAX Air Clutch to effortless tripping automatically adjusts the operating cycle of the Press to the natural working rhythm of the operator, giving increased outputs with less exertion.

Uniformity of product, close tolerances, longer die life and the increased production made possible by the AJAX Direct-Acting Air Clutch are further evidence of the long range wisdom of buying forging equipment on the basis of mechanical soundness. Write for Bulletin 65 B.

★ BUY FORGING EQUIPMENT ON THE BASIS OF MECHANICAL SOUNDNESS ★

# THE AJAX

## MANUFACTURING COMPANY

EUCLID BRANCH P. O. CLEVELAND, OHIO

621 MARQUETTE BUILDING • CHICAGO, ILLINOIS

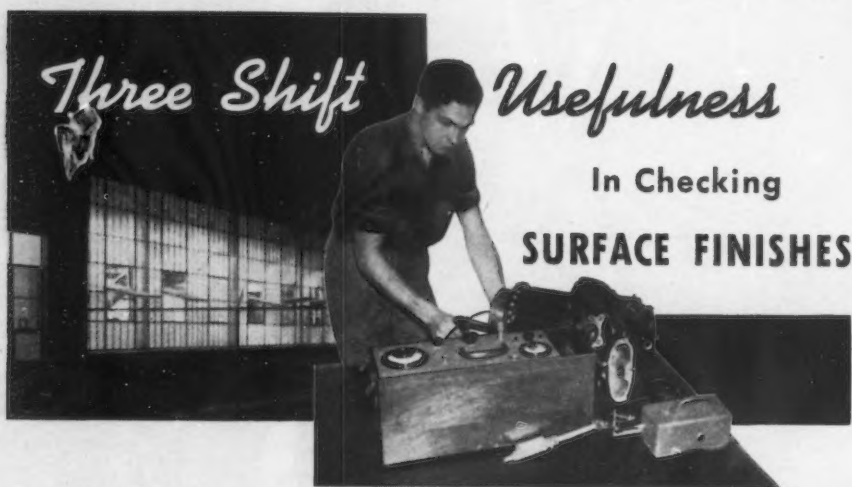
## Ford, Goodyear Experiment With New Type Tires

Detroit

• • • Without details, Ford Motor Co. revealed here last week that it is experimenting with tires that are made with only one-sixteenth the usual amount of rubber. This was followed within a few days by announcement by Goodyear Tire & Rubber Co. that it is experimenting with tires made entirely without rubber.

## Prizes Are Doubled in "Blast Axis" Idea Contest

• • • Increased war production, by broadcasting new and unique industrial uses for compressed air, is the goal of the "Blast The Axis Program" conducted under Compressed Air Institute sponsorship. The value of each cash prize has been doubled, bringing the total to \$1000. The duration of the program has been extended one month, to terminate July 1, 1942.



*Three Shift* *Usefulness*  
In Checking  
**SURFACE FINISHES**

## Built Into EVERY PROFILOMETER

If surface finish is important in your manufacturing operations, accurate measurements of surface roughness are necessary during every production hour. The methods employed in securing these measurements must be direct, dependable, and simple enough to be easily understood by men on every shift.

When required, Profilometers can be used without interruption 168 hours a week. While very sensitive instruments—giving extremely accurate measurements—they are sturdily built for trouble-free operation anywhere in the plant. Direct dial readings in true inch units conform to the accepted roughness ratings shown on blueprints. No computations or scaling methods are required.

Profilometers are entirely practical . . . flexible in their application . . . easy to use. They can eliminate uncertainties, waste motions, chances of error . . . and help to speed your production.

### For Constant Operation on A-C Lines

The power pack illustrated converts the Profilometer so that it may be operated on 115 volt 50-60 cycle power lines. Standard Profilometers are self-contained, complete with batteries, to permit full portability.



# The PROFILOMETER

PHYSICISTS RESEARCH COMPANY

343 SOUTH MAIN ST.

• ANN ARBOR, MICH.



LECTURER: Louis Lingler of the Sheffield Corp. has delivered lectures on "Gaging Practices in Modern Industry" to 85 university and defense training groups in Cincinnati, Cleveland, Chicago and Detroit, during the last three months. Beginning May 1, he plans to spend four months on university and company training courses in the East. He demonstrates actual instruments and presents about 50 slides.

## Production Records Cited In U. S. Steel Publication

• • • The "Production for Victory" edition of "U. S. Steel News," published April 16, disclosed an unprecedented number of production records attained by subsidiaries of United States Steel Corp. One subsidiary was cited as having established 157 new production records in 1941. These included new high marks by 22 of its 57 blast furnaces, by 16 of its 25 steel producing departments, by 46 out of 92 primary and finishing mills, as well as 73 all-time records in plants producing molds, wheels, axles, armor forgings and castings.

## Paint and Varnish Industry Finds Material Substitutes

Buffalo

• • • The paint and varnish industry here has developed substitutes for important basic ingredients. Manufacturers say substitutes have been found for tung oil, and that titanium pigments are being replaced by ilmenite ore products. Terneplate is being substituted for tinplate in packaging of paints.



## Morey Presents 100th Shaper To Ordnance Department

• • • Acclaiming increased speed in war machine industries, Capt. Donald B. MacMaster of the U. S. Ordnance Department, officially received on April 18, the 100th vertical shaper to come off the production line at the Morey Machinery Co., Astoria, New York City. The presentation of this shaper, now used chiefly in the manufacture of breech block mechanisms for guns up to 75 mm., was made by Sigmund Morey, president of the company.

Captain MacMaster congratulated the 450 workers of the company upon having produced this important machine, which he declared was another step towards victory. He urged their redoubled efforts for further production.

Mr. Morey said that although it had taken a year of experimentation to perfect the vertical shaper, the plant is now prepared to turn out several of these machines weekly.

The Morey Machinery Co. was established in 1914 to rebuild machine tools and to deal in used equipment. When England entered the war in 1939, Sigmund Morey began to design machine tools needed in the war. His rebuilding plants were soon converted to new machine manufacturing. The Morey company now produces a variety of munition making machines, and its plant, which normally employed 75 men, has been augmented to 450.

## Problem of Moving Coal Forces Action by ODT

• • • Because of enemy submarine activity and other factors, steps are being taken by the Office of Defense Transportation to help insure the movement into the Eastern seaboard region of large amounts of coal which formerly moved by water along the coast. Much that formerly moved by rail to tidewater for transshipment by collier must now move the entire distance to Baltimore, Norfolk, Va., Philadelphia and New England points by rail.

Samuel S. Bruce, Pittsburgh, has been appointed assistant director of the Division of Railway Transport in charge of coal movement and equipment. He has been associated with Koppers Co. for 26 years. His duties will involve

efforts to accelerate loading and unloading of coal, to eliminate cross-hauling, and to minimize terminal delay.

So far in the East small foundry and other users have not become seriously concerned over the necessity for stocking coal and coke for next winter. Accustomed to convenient truck delivery, the buyers apparently feel that some of the government warnings which have been issued frequently

recently are overly ominous.

To save small producers of anthracite from operating at a loss through the period when the government is calling for an unusually high level of production, OPA last week amended the anthracite price schedule to eliminate seasonal discounts in sales at the mines. At the same time OPA refused industry requests for a 25-cent per ton increase for domestic and pea sizes.



## PRESSED COLD by PARISH In 4000 ton Press

The method best suited for each particular stamping—to insure most effective results, most efficient production and most modest cost—is employed when you present your problems to the Parish plant.

Equipped to handle all types of work in all methods and sizes of stamping, our plant is able to meet your specifications in all its elements, including the factor of time.

Illustrated is a Spring Plank for rail-road freight car trucks. Made of 7/16" metal—16 5/8" wide at ends, 14 1/4" wide at center and 93 1/4" long with flanges 3 3/8" high at center, 2 3/16" high at ends—it was pressed cold from heavy steel.

The submission of your requirements for review involves you in no obligation.

## PARISH PRESSED STEEL CO.

READING, PENNA.

Pacific Coast Representative  
F. Somers Peterson Co.,  
57 California St.,  
San Francisco, California

We have turned our facilities over entirely to the manufacture of various products required by the United States Government and American Railroads.

### Keystone Steel & Wire Nets \$364,083 in First Quarter

Peoria, Ill.

••• For the quarter ending March 31, the third quarter of the company's fiscal year, Keystone Steel & Wire Co., reported a net profit of \$364,083 after deduction of all charges including the provision of \$405,577 for federal income and excess profits taxes. Earnings for the same period last

year totaled \$410,137. The total earnings for the nine months ending March 31, is \$1,130,496, compared with \$979,512 for the same nine months of the last fiscal year.



### Otis Nets \$240,015

••• The Otis Steel Co. announced net profits of \$240,015 for the first three months of 1942, compared to \$416,622 for the corresponding

period of 1941. Provisions for federal taxes on income, deducted from the earnings, totaled \$375,000. The decrease in earnings for the quarter just ending, compared with any quarter in 1941, was due to the smaller profit margin on products manufactured by the company for the war effort than for products made during normal times; substantially increased operating costs while selling costs remain fixed; the shortage of steel scrap which limited the company's production and shipments; and increased federal taxes on income.



### Sharon Earns \$250,302

••• Sharon Steel Corp., for the three months ended March 31, reported net earnings of \$250,302, after providing \$625,000 for federal and Pennsylvania income taxes.



### Wickwire Spencer Report

••• For the first quarter ending March 31, Wickwire Spencer Steel Co., and its subsidiary, American Wire Fabrics Corp., reported a net income, before provisions for taxes, of \$721,580, compared with \$231,172 earned during the corresponding period in 1941.

### Plumbing Distributers' Subcommittee Appointed

Washington

••• The formation of a distributors' subcommittee of the plumbing and heating industry advisory committee has been announced by WPB's Bureau of Industry Advisory Committees. W. W. Timmis, chief of the plumbing and heating branch, is government presiding officer. Committee members are:

M. W. Dennison, executive director, Braman Dow & Co., Boston; W. A. Brecht, president, Hajoca Corp., Philadelphia; F. W. Swanson, president, Globe Machinery & Supply Co., Des Moines, Iowa; Frank E. Elliott, manager, Crane Co., San Francisco; A. T. Chameroy, Sears, Roebuck & Co., Chicago; R. W. Conway, Hechinger Co., Washington, D. C.; H. G. Starr, executive secretary, Plumbing & Heating Wholesalers of New England, Inc., Boston; N. J. Higinbotham, president, W. A. Case & Sons Mfg. Co., Buffalo; J. A. Galloup, president, Galloup Pipe & Supply Co., Battle Creek, Mich.; W. J. Spillane, general manager, James B. Clow & Sons, Chicago; Milton M. Goldsmith, president, Sam S. Glauber, Inc., New York; John Selpole, division manager, Montgomery Ward Co., Chicago; Theodore Feinstein, executive director, National Supply Association of America, Boston.

## DOUBLE YOUR MACHINE TOOL PRODUCTION

With this Small Piece  
of METAL



## How KENNAMETAL can help you contribute to the WAR EFFORT



Machine tools such as engine lathes, boring mills and turret lathes often produce twice as much work per day when equipped with KENNAMETAL tools. KENNAMETAL machines steels up to 550 Brinell hardness at speeds 2 to 6 times as great as those possible with high speed steel. It removes 3 to 10 times more metal between regrinds and often saves additional time by roughing and finishing in one cut.

Be sure you get everything possible from every machine in your plant. KENNAMETAL can be installed quickly on old or new machines . . . and if you are now using high speed steel tools, KENNAMETAL can double your output of steel parts.

WRITE FOR FREE KENNAMETAL  
VEST POCKET MANUAL



## McKENNA METALS Co.

144 LLOYD AVE., LATROBE, PENNA.

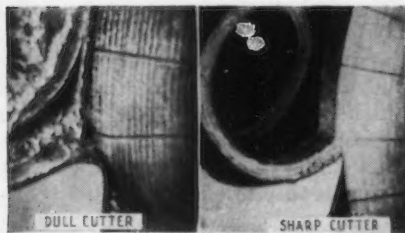
Foreign Sales: U. S. STEEL EXPORT CO., 30 Church St., New York  
(Exclusive of Canada and Great Britain)



## W & S Film Shows How To Grind Cutting Tools

Cleveland

••• A staff of specially trained instructors will be made available free to conduct a one-hour program on the technique of grinding and setting cutting tools in metal working plants and training schools all over the country, it is announced by the Warner & Swasey Co., turret lathe builders. The program, designed to be given to operators and trainees, will feature high-speed sound moving pictures which slow up and magnify metal turning operations and thus reveal the action of cutting tools. A new service of the company's Turret Lathe Operators Service



**CUTTER ACTION:** Slow motion close-ups from the motion picture, "Chips" shows the operation of cutters. "Chips" is a feature of the Warner & Swasey Co.'s new training program on grinding and setting cutting tools. The distance between the marks on the work pieces is about  $\frac{1}{8}$  in.

Bureau, the instructors and film will be available upon request without charge.

The company pioneered in in-plant instruction for turret lathe operators a year and a half ago and has since conducted programs in over 1000 metal-working plants.

In addition to the sound film, the lecturers will use model tools, giant model cutters and charts, and will distribute to the operators a 16-page booklet which highlights the fundamentals of the instruction.

Sound film, which is entitled "Chips," shows at 1/100th actual cutting speed exactly what happens when a cutter is ground correctly and what happens when it is ground incorrectly. It also includes instruction in the use of chip grooves, how to control size and length of chips, the function of coolants, and the advantages of honing cutters.

"The performance of cutting

tools, more than any other single factor, determines what the operator gets out of his machine," Walter K. Bailey, Warner & Swasey vice-president, explains. "Existing plant equipment as well as the modern equipment being built by the machine tool industry has an enormous capacity to turn out war production and every effort should be made to use that capacity to the limit."

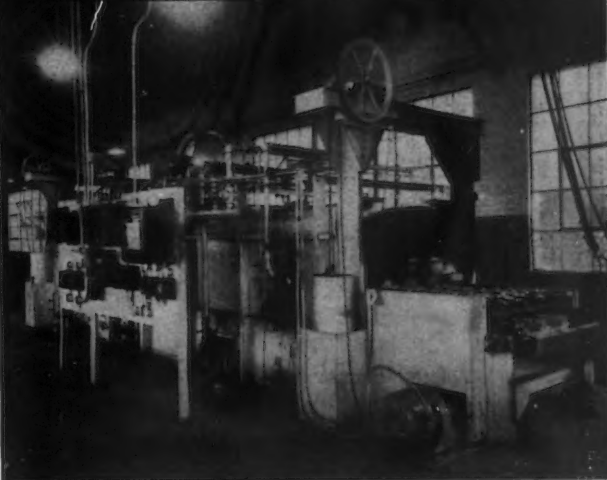
## Machine Tool Dealers Plan Cleveland Meeting

••• The spring meeting of the Associated Machine Tool Dealers of America will be held on one day only, Friday, May 1, at the Hotel Cleveland, Cleveland, according to F. B. Scott, Jr., president of the association. There will be morning and afternoon sessions, limited to members only.

# DEMPSEY INDUSTRIAL FURNACES

There is a  
DEMPSEY  
FURNACE  
for every  
Heat Treating  
requirement...

Recirculating  
Continuous  
Conveyor  
Bright Annealing  
Clean Hardening  
Shell Forging  
Shell Nosing  
Shell Heat  
Treating  
Cartridge Case  
Annealers  
Billet Heaters  
Coil Annealers  
Normalizers



Charging end of continuous normalizing, annealing and heat-treating furnace

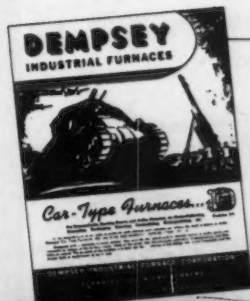
## Will Pay for Itself in Less Than One Year!

The Dempsey furnace pictured above is a striking example of the superiority of Dempsey equipment where performance, economy, and production speed are important. Its controlled cooling cycle is outstandingly efficient in annealing operations. In addition to maintaining a more uniform temperature, thus producing higher-quality work, it...

- Saves Fuel
- Eliminates Labor
- Adds longer life to Tools
- Does the work of many smaller furnaces
- Reduces Costs

Our engineering staff will gladly survey your needs and suggest similar time-, labor-, and money-saving equipment.

**New Bulletins**  
give complete details. Write for them today.



**DEMPSEY INDUSTRIAL FURNACE CORPORATION**

SPRINGFIELD, MASSACHUSETTS

**FURNACES—OIL & GAS BURNERS**

*Offers Combined 50 Years' Experience Building:*

DEMPSEY FURNACES since 1917 • GILBERT & BARKER since 1904

### Deal with Krupp Held Benefit to U. S. Industry

••• A committee hearing on a wartime patent bill last week in Washington developed into a lengthy discussion of the tungsten carbide situation. For three days attorneys from the Justice Department's anti-trust division testified in criticism of agreements between General Electric Co. and the Krupp interests of Germany.

Dr. Zay Jeffries, chairman of Carboloy Co., Inc., G.E. subsidiary, and W. G. Robbins, president of Carboloy, refuted the monopoly charges and other inferences. Statements by the company officials included:

Assertion by Mr. Robbins that in 1938 there were some 97 makers of Carboloy tools in the United States and that at no time were all carbide makers under license or price control. He said, "as far

### Spring and Bumper Pool Will Get \$50 Million

Washington

••• Standard Steel Spring Co., Coraopolis, Pa., leader in the mammoth pool of spring and bumper companies converting to the production of armor plate, is negotiating a \$50,000,000 loan through the Union Trust Co. of Pittsburgh, the RFC announced April 16. The Union Trust Co. and the National Bank of Detroit have agreed to handle \$2,500,000 each of the total, with the Federal Reserve System acting as fiscal agent for the War Department, guaranteeing 90 per cent of the loan.

RFC says that it is willing to finance the remainder of the loan, or any part of it, on the same terms and conditions.




• In most metal working operations the tool or die is a small item when size is considered. Yet, measured by any other standard, it is the most important—for unless the tool or die does its job perfectly the entire effort is wasted.

Without the proper tools, large forgings and castings cannot be machined; and without the proper dies sheet plate and strip cannot be formed.

The Jessop Steel Company is a maker of fine tool and die steels, having had experience in making quality steels since 1774. We will be glad to help with your tool and die steel problems. Write us for information on steels to fit your specific needs.

There is a JESSOP steel for every tool and die requirement.



**JESSOP STEEL CO.**  
GENERAL OFFICES  
WASHINGTON, PENNA.

**JESSOP STEELS** FOR AMERICA AND HER ALLIES

CARBON • HIGH SPEED • SPECIAL ALLOY • STAINLESS • COMPOSITE STEELS

as the present patent relationship with Krupp is concerned, there just isn't any. Anyone can make carbides."

Declaration by Dr. Jeffries that "our companies through agreement with Krupp and through initiative and enterprise, built an important industry in the United States which is one of its great facilities for national defense." He asserted that it now seems probable American production is higher in pounds than that in Germany.

Explanation of price structure by Dr. Jeffries, which showed that in spite of a series of company deficits, price reductions were made steadily. "It is true that shortly after the company was organized, the price of \$1 per gram or \$453 per pound was set for cemented tungsten carbide," he said. "It is also true that the cost of making carboloy tips in the factory could be visualized at less than \$50 per pound but it was also learned that the efforts of Krupp to sell its material in the American market were not successful. A plan had to be devised to insure the success of the tungsten carbide business." He went into detail on costs and showed that the American product was given a higher rating per dollar than the German.

"At the outset I want to make it clear that I am in favor of reasonable legislation which will make it possible for the government to secure the benefits of any and all patents for our war effort," said Mr. Jeffries.



## Whiting Corp. Acquires Hydro-Clone Line

••• Whiting Corp., Harvey, Ill., has announced the acquisition of the Hydro-Clone line of dust and fume suppression equipment for foundry and industrial application. E. F. Fisher, inventor of the Hydro-Clone equipment, is in charge of this department which has been made a part of the Whiting Equipment Division.

Hydro-Clone units are said to effectively suppress dusts and fumes by a process of disintegration in which dust and fume laden air mixed with water is subjected to high velocity impact.

## Sale of Wolverine Tube Up

••• Stockholders of Wolverine Tube Co., Detroit, will vote at their annual meeting on April 28 on a proposal to wind up the company's operations after a quarter century of activity. An offer to purchase the company has been made by Calumet & Hecla Consolidated Copper Co., according to Charles C. L. Limbecker, president of Wolverine. It is explained that a disadvantageous raw materials situation for Wolverine, which is purely a fabricating concern, is the chief factor in the decision to sell.

**AXIS BEHIND 8-BALL:** The roadway into Goodyear Aircraft Co., Akron, is placarded with 8-balls, following a campaign to impress workers of the importance of their achieving the "plane-every-8-minutes" goal requested by WPB chief Donald M. Nelson.

Wide World Photo



## Plane Plants of Brewster Are Seized by U. S. Navy

••• Charging that the management of Brewster Aeronautical Corp. "has not proved adequate under the circumstances confronting it effectively to operate the corporation's plants," President Roosevelt on Monday, April 20, directed the Navy to operate Brewster plants to assure delivery of combat aircraft.

No armed forces were required

in the seizure. The company has two plants on Long Island, one at Newark and one at Johnsville, Pa. A preliminary Navy report April 14 blamed "labor leaders' demands for slowdown" as well as "inefficient management."

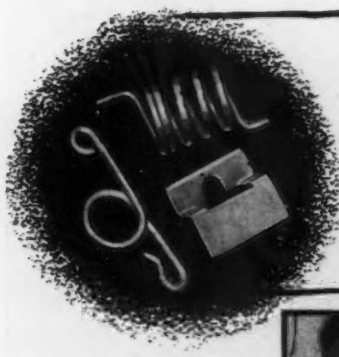
## WPB Allows Inland Expansion

••• WPB has approved Bessemer expansion at the Inland Steel Co. plant, Indiana Harbor, Ind.

## Parts Like These

- Manufactured to users' specifications
- Produced for specific applications
- Made in all kinds of metals and alloys

Let us know what you want to accomplish; we will help to solve your problem.



### SPRINGS

Compression, extension, torsion and flat types, with various kinds of ends and loops—made in steel, brass, bronze and other alloys—formed; heat treated and tested for specific functions and applications.

### STAMPINGS

Small stampings of any shape or form made to users' specifications or developed to fit certain conditions—made from various metals and alloys; also heat treating, spot welding and tapped assemblies.

### WIRE FORMS

Pins, clips, cotters and other various, intricate shapes in rounds, flats and squares including heat treating and welded assemblies for every kind of mechanical application; and from all types of metals.



# M-D-HUBBARD SPRING CO.

331 CENTRAL AVE. • PONTIAC, MICH.



### Freeport Sulphur Subsidiary To Mine Cuban Nickel Ores

••• Large deposits of low grade nickel ores in Northeastern Cuba are to be treated by a complicated chemical and metallurgical process for recovery of their nickel content by Nicaro Nickel Co., a new subsidiary of Freeport Sulphur Co., according to William L. Batt, WPB Director of Materials. Samples of ore treated in a small pilot plant at Freeport, Texas,

completed in August, 1941, indicate that the small but important nickel content in the ore can be recovered economically, and a \$20,000,000 plant with complete recovery facilities has been authorized to be built. The plant, the location of which was not indicated, will be financed by RFC and operated by Nicaro Nickel Co. for the government.

Nickel deposits, in addition to those in Cuba, are known in North and South American countries.



65 Ton Switching Locomotive

## Atlas Diesel-Electric Locomotives for Lower Hauling Costs

☆ Today's "Victory Bound" Industrial Plants demand equipment that not only has the ability to meet all the operating conditions of the job, but it must be able to operate 24 hours per day, day after day. Atlas Diesel-Electric Locomotives can do just that.

1. They are built of rugged, heavy-duty construction throughout, to stand the strain of continuous operation.
2. They are easily accessible for minor repairs and lubrication.
3. They feature a totally enclosed, double reduction spur gear drive.

Submit your haulage problems to us for a recommendation of the Atlas Diesel-Electric Locomotive to meet your requirements. No obligation, of course.

## The ATLAS CAR & MFG. CO.

CLEVELAND, OHIO • U. S. A.

### Capacity of Electric Furnaces Up Sharply

••• Electric steel capacity in the United States which officially was set at 3,737,510 tons as of Jan. 1, 1942, because of current construction and projects which will be in progress during the latter part of this year is expected to reach 6,000,000 tons annually by next April or May. The only factors which will prevent the reaching of this level will be the inability to obtain material. It is believed that by September or October of this year annual electric steel capacity will approach 5,000,000 tons. Some projects have been increased over the original program.

### Foundrymen Hear Plea for Complete Devotion to War

Cleveland

••• An appeal for complete devotion to war production "no matter how many hours it takes" was made to foundrymen at the opening session of the 46th annual convention by Herbert S. Simpson, president, American Foundrymen's Association. Mr. Simpson asked some 200 foundrymen in attendance to "give all, not part, of our efforts to give our fighting men what they need to defeat the enemy."

Over 8000 visitors attended the opening session of the foundry show which continues through the entire week of April 20.

Exhibits indicated the vital role that foundrymen are playing in the war program, and it is reported that about 90 per cent of the industry's capacity is now concentrated in war work. Mr. Simpson believes that this year's output of castings will exceed the 1941 total by 25 per cent, despite the radical curtailment in consumers' goods production.

### Dodge Named WPB Official

Washington

••• H. W. Dodge, Bronxville, N. Y., has been appointed assistant deputy director of the WPB materials division. Mr. Dodge had been general sales manager of the Texas Co. since 1933. He has been connected with the materials division since Dec. 29, 1941, as a general assistant to the director.



## No Deliberate Violations, Perry Tells C-I Workers

Pittsburgh

••• Calling attention to newspaper accounts reporting the WPB had charged Carnegie-Illinois Steel Corp. with "repeated, deliberate violations of priority regulations" and that the Department of Justice had filed a complaint in the courts, J. L. Perry, president of Carnegie-Illinois, said in a message to employees "there has not been nor will there be in the company any 'repeated, deliberate violations of priority regulations.'" He assured the employees that "this unwarranted incident in no way reflects upon the magnificent production job that has been and is being accomplished within this company in furthering the war effort. . . ."

## War Department Announces Latest Construction Jobs

••• The War Department announced April 17:

1. Award of a contract to Metcalf Construction Co. of Omaha, for construction and management services in connection with a plant in Nebraska. Construction will cost in excess of \$5,000,000, and will be supervised by

the Omaha district office of the Corps of Engineers.

2. Authorization for construction of an air force flying school in Lawrence County, Ill., and Vincennes, Ind., to cost in excess of \$5,000,000. In connection with this project a contract for architectural-engineering services has been awarded to Miller & Yeager, Terre Haute, Ind., and Bevington-Williams, Inc., Indianapolis. Construction will be supervised by the Louisville district office of the corps of Engineers.

3. Award of a contract to Kelly Springfield Engineering Co., Cumberland, Md., for consultant service, equipment procurement and installation and operation of a manufacturing plant in Maryland. Construction will cost in excess of \$5,000,000 and will be supervised by

the Washington, D. C., district office of the Corps of Engineers.

4. Authorization for construction of an air force training school in Colorado to cost in excess of \$5,000,000. Construction will be supervised by the Denver district office of the Corps of Engineers. This project is located at Buckley Field, near Denver, Colo.

5. Authorization for construction of an air force training school in Tennessee, to cost in excess of \$5,000,000. This project is located at Berry Hill Field, near Nashville. Construction will be under the supervision of the Nashville district office of the Corps of Engineers. In connection with this project a contract for architectural-engineering services has been awarded to Warfield & Keeble of Nashville, Tenn.

## Stretching Production Hours!



WITH *"Buffalo"* BENDING ROLLS

• Buffalo Bending Rolls have revolutionized old ideas about metal fabrication. With these machines, even unskilled labor can accurately and swiftly turn out arcs, circles, spirals and other circular forms on a wide variety of stocks. Valuable time is whittled off of every operation — production hours stretched!

**BUFFALO FORGE COMPANY**  
492 Broadway Buffalo, N. Y.  
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

*"Buffalo"*

**Bending Rolls**



## Gradual Easing of Ratings Prelude to New PRP Setup

••• The WPB soon will discontinue granting preference ratings on individual applications for material for general manufacturing. This action, according to WPB, is a further step toward putting industry under the Production Re-

quirements Plan. Virtually all industries requiring priority aid are expected to apply under the PRP for the quarter beginning July 1. A single application will cover all requirements for materials for a calendar quarter (or for the re-

mainder of a calendar quarter when the application is filed in an interim period).

**Effective immediately**, no individual application from a manufacturer for materials to be incorporated in his products over a period of more than one month will be approved.

Some producers, who need priority aid for only a few materials, have been filing applications from time to time on individual PD-1-a forms. The new plan restricts the amount of materials to which ratings may be assigned in this way, and the new policy will give

*Story on WPB's court actions against alleged priority violators will be found on page 79.*

the WPB a tighter check on the volume and uses of materials for which ratings are assigned, as well as inventory data.

Producers whose annual volume of business is less than \$100,000 may file their PRP applications on a simplified form, PD-25-x. All others must use the regular PD-25-a application. Instructions have been made against "hand processing" of priority applications received by the WPB. No priority applications will be accepted from anyone who presents them in person except in Room 4-101 of Temporary Bldg. "E."

## TRADE **AUTOMATIC** MARK

Manufacturers for Over Thirty Years

### MODERN *Electric Propelled* **INDUSTRIAL TRUCKS** FOR ECONOMICAL MATERIALS HANDLING

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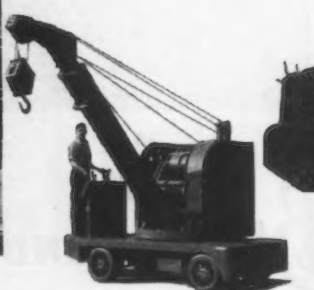
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### Pipe Line

••• Upon recommendation of the Office of Petroleum Coordinator, WPB has granted an A-1-a rating on small amounts of new steel pipe for a project which it was stated will make the refineries of the San Francisco Bay area entirely independent of ocean transportation for their crude oil supply early in June. The project involves conversion from natural gas to crude oil of the 24 to 26-in. Stanpac pipeline.

### Laundry Machinery

••• Commercial laundry and dry cleaning machinery production was halted by Order L-91, effective immediately. It prohibits production of commercial laundry equipment after June 1, and of commercial dry cleaning equipment after July 1, except for Army, Navy or Mari-



## PRIORITIES

time Commission orders, or upon authorization on form PD-418, which will be ready for distribution in 10 days. After May 15 only producers operating under PRP will be allowed to manufacture equipment whether or not for the military services and the Maritime Commission. Producers who do not make application for a rating under PRP will not be able to manufacture laundry and dry cleaning machinery for any purpose after June 1.



### Steel Plant Repairs

••• WPB stressed that before any rating may be extended to a supplier of materials under Steel Plant Order P-68, the steel producer must be assigned a serial number by the WPB Iron and Steel Branch. Steel producers operating under this order must file semi-annually form PD-228 with the WPB Iron and Steel Branch.



### Mine Explosives

••• An A-1-c rating was granted mine operators to obtain explosives and explosive equipment in an amendment to preference rating order P-56, issued on April 14 by WPB. Under the original order a preference rating of A-8 was assigned to deliveries of operating supplies, including explosives.



### Household Furnaces

••• Order L-42 limits manufacturers of warm air furnaces who made more than 8000 units in 1940 to use, during 1942, 50 per cent of the iron and steel consumed in 1940. Producers of less than 8000 units are required to reduce consumption 10 per cent in 1942.



### Oil Burners and Stokers

••• Residential purpose manufacture of oil burners and stokers must cease after May 31 and producers may not make this heating equipment except on orders of A-10 or higher under the terms of orders L-74 and L-75 issued April 15.

### Form PD-336 Revised

••• For greater handling convenience, form PD-336, heretofore used in filing reports required by distributors' order L-63, has been reduced in size to a standard 8½ x 10 in. and may be reproduced for use. An explanation of the certification has also been added to the form. Form PD-336 must be used only as revised.

### Warehouse Inventory Reports

••• Products listed in schedules A and B of the steel warehouse order, M-21-b, may be omitted from inventory reports required by suppliers' limitation order L-63, according to an announcement made by WPB. Ingots, steel bars, wire and other products are listed in these schedules.

Exemption No. 1 of limitation order L-63 specifically exempts



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warehouses coming under the provisions of order M-21-b from the provisions of L-63 so far as material listed in the schedules attached to M-21-b is concerned. However, they are subject to the provisions of order L-63 for all such supplies other than those covered by M-21-b. This means that warehouses that buy steel from a producer and also carry other supplies affected by order L-63, may disregard the steel supplies speci-

fied by order M-21-b in calculating the amount of inventory they are permitted to carry by L-63. The exemption is granted to avoid an unnecessary double control of inventories of steel products.

The distributors' branch of the Division of Industry Operations explained at the same time that no priority assistance will be granted on the distributor's application form, PD-1X, for any materials listed in schedules A or B of sup-

plementary order M-21-b, and such materials should not be included in any PD-1X application.



### Protected Delivery Dates

••• The article appearing on page 151 of THE IRON AGE, April 9, relating to scheduling of materials with protected delivery dates should have said that protected dates would be assigned by the WPB Iron and Steel Branch to certain projects operating under order P-19-a, b, and c.

When projects are selected by the Branch to receive this special treatment the following paragraph will appear on the schedule:

**"Protection of Delivery Dates:** After the rating assigned by the order has been applied to deliveries of any material entitled to be rated under the order, such deliveries must be made in exact conformance with the delivery dates specified in the contracts or purchase orders therefore, and such delivery dates shall not thereafter be deferred or otherwise postponed by any preference rating certificate, preference rating order, general preference order, or other order assigning a preference rating, whether higher or not, except as specifically directed by the Director of Industry Operations."



### Heavy Compressors

••• WPB placed heavy compressors, urgently needed in the war production program, under a system of complete allocations. The order, L-100, prohibits placing or accepting orders for compressors covered by the regulations unless specific authorization is made on form PD-420. Application for authorization to place orders must be made on form PD-415.



### Farm Machinery

••• An A-1-a rating was granted by WPB to farm machinery manufacturers by amendment No. 2 to order P-95. Producers may apply the rating only for material sched-

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## PRIORITIES

uled to be delivered in their plants before June 30, to be used in the manufacture of a specified list of farm machine products. The rating cannot be used to obtain rubber. All uses of the A-1-a rating must be reported monthly on form PD-81.



### Rhodium Restriction

••• All uses of rhodium in the manufacture of jewelry were barred last week by WPB by an amendment to order M-95. The order, issued March 11, stopped electroplating of rhodium jewelry but did not stop all uses of the metal in jewelry making. The important war use of rhodium is to coat reflectors in anti-aircraft searchlights.



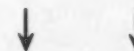
### Chicago Mills Delivering Only On A-1-k or Better

*Chicago*

••• A check of two major steel producers in the Chicago district showed that A-1-k ratings are the lowest receiving attention. The producer shipping on A-1-k indicated that such rating was good for delivery on reinforcing bars only. Semi-finished steel is being shipped on A-1-j, but the ratings on sheets are A-1-f.

Plates are strictly A-1-a, as are alloy steels. Carbon bars range from A-1-a to A-1-k, depending upon the company's mills in this area. Structural and piling are both A-1-b, while railroad material shipped by this producer is all by allocation.

Lowest ratings being shipped from the other producer's mills are A-1-f. Plates are 100 per cent allocated, as is railroad material. These producers indicated that their books are practically void today of all non-rated tonnage.



### Mills Co. Output Suspended For Priority Violations

*Washington*

••• The first manufacturer to be penalized for war time violation of

priority orders, WPB announced, was Mills Novelty Co., Chicago. Under suspension order S-37, it was alleged that from Dec. 22, 1941, to Feb. 7, the company, makers of "Panorams" coin operated amusement machines diverted substantial amounts of aluminum, copper, steel and other scarce materials from the war program, prohibited by order L-21.

The suspension order enjoins the Mills Co. from selling or delivering any machines manufactured in excess of quota, and further curtails the number that may be produced during March and April. Additional penalties imposed include refusal of all priority assistance and allocations of any restricted material until the expiration of the order on July 10.

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## WPB Lays Plans for Machine Tool System

Washington

• • • The WPB is said to be putting the finishing touches on a plan for complete allocation of machine tools, to go into effect some time before July 1. Known as the "stamp plan," the new system will replace the present priority setup and the numerical urgency rating list. A stamp will be issued by WPB for every machine tool now on order and after the effective date, a buyer will have to receive a stamp from one of three issuing authorities before an order can be given to a machine tool builder for a machine.

Although WPB will control the issuance of stamps, the allocation of stamps among war goods producers will be in the hands of three groups: (1) The Army and Navy Munitions Board, representing the armed services and the Maritime Commission; (2) Lend-Lease authority, representing foreign buyers, including Great Britain, the Dominions, Russia and China, and (3) the WPB itself, which will handle distribution of stamps to strategic machinery manufacturers like those supplying equipment for the production of butyl rubber, high octane gasoline and explosives.

The first step will be to analyze existing orders and to issue validating stamps covering these orders. Numerically numbered stamps will be issued covering every single machine tool on order. These stamps will be issued in blank by WPB to the three distributing agencies in batches, the first 500, for example, being divided up into 300 for the A. & N. Munitions Board, 150 for Lend-Lease and 50 for critical domestic needs. The figures are merely illustrative. Each group will then pass them on to the machine tool builder to whom an order has already been given.

Since the serial number will determine the order of delivery, the net result will be the almost complete rearrangement of all existing delivery schedules. The only concession contemplated is that such rearrangement of schedules shall not interrupt production. This means that if machine tools are being put through the shop in lots, the lots will not be broken up to accommodate orders of lower sequence numbers, but the sequence numbers will determine the order

of shipment of machines in a particular lot.

After all existing orders have been covered by stamps, the future producing capacity of each machine tool builder will be analyzed for allocation of new order stamps. It should be noted that each stamp will contain a brief description of the machine by a uniform classifi-

### Use the Latest Guide On Priority Orders

• • • To do business under war-time conditions, industry in the United States and Canada must keep itself informed as to the latest developments in Government priority regulations.

IRON AGE readers who have been using the four earlier priority guides issued by this publication are urged to DESTROY these guides and use only the fifth edition.

The fifth edition of the IRON AGE priorities guide, issued to help industry understand priority regulations, includes:

- 1—An index of material and equipment.
- 2—Instructions for using the guide.
- 3—Descriptions of all priority orders.
- 4—Description of priority regulations.
- 5—How to Obtain Relief from M and L Orders.
- 6—PD forms to use with priority orders.
- 7—PD forms which do not have to be filed.
- 8—How to extend P orders.
- 9—Field offices of the priority division.
- 10—Directory of war production board.
- 11—How priority applications are handled by the WPB.

• • • Copies of the latest edition of the priorities guide may be obtained from the IRON AGE, 100 East 42nd Street, New York. Prices are: one to 10 copies, 25c. each; 11 to 100 copies, 20c. each; 101 to 300 copies, 18c. each. Please send stamps in payment for orders of less than four copies.

cation now being set up, the name of the manufacturers, the name of the buyer and a description of the end product, the last a type of information particularly applicable to subcontractors. Through his contracting agency, a buyer will be permitted to name the particular make of machine tool he would like

to have, say a 6-ft. radial drill with 10-in. column, but if the stamps covering that particular size and type are all allocated, he will be obliged to accept a stamp calling for an identical radial drill from another machine tool builder. The stamp can be passed only to the builder named on the stamp.

Another set of stamps will be issued to take care of transfers between purchasers, a situation that frequently comes up when one contractor is not ready to accept delivery because of other holdups, but is willing to defer his delivery to a contractor ready to put the machine to work immediately upon receipt. Emergency stamps will also be available to take care of specific bottlenecks on important war items.

The new setup will affect standard tools first. For tools carrying a large amount of special tooling and accessories, a period of grace will be allowed to let the machine tool builder adjust present manufacturing schedules.

One of the principal objects of the plan is to level off somewhat the peak of unfilled orders possessed by some machine tool builders and raise correspondingly the backlogs of companies whose products are in lesser demand.

Another reason is the desire of the WPB to control more closely the purchase of machine tools by war contractors with present high priority ratings. Naturally, it has been the desire of such contractors to provide themselves with the best tools available, looking perhaps to their competitive position after the war.



### Plate Allocations

Washington

• • • Following a telegraphic survey of steel plate consumers' inventories, C. E. Adams, chief of the WPB Iron and Steel Branch, announced on Tuesday that users with excessive inventories will receive no allocations in May.

A constant check on plate inventories is being made, Mr. Adams said, because demand continues at least 50 per cent in excess of rising plate production. Output is expected to be in excess of 900,000 tons. Workers at the Cleveland plant of Republic Steel Corp. recently set a world record of 4000 tons of plate during a 24-hr. period, Mr. Adams revealed.



## New Restrictions on Iron, Steel Coming

Washington

••• Deliveries of iron and steel products will be restricted to preference ratings of A-10 or higher after May 15, WPB announced on Tuesday with the issuance of an amendment to M-21.

The order formerly applied to steel products only and the inclusion of iron means that the 2700 iron companies in the country must comply with its provisions.

Form PD-73 is abolished effective May 1. Instead of filing this form each purchase order must contain a signed statement by duly authorized agent of the purchaser either stamped or typed on the order, stating the material is to be used for one of the group classifications set up in the order. These are: Army, Navy, Maritime, war plants, lend-lease, other export, railroad, warehouse, and all other. Warehouses may deliver carbon steel on unrated orders when the purchaser says the material is to be used for maintenance and repair. Each warehouse is limited by quarters to 3 per cent of its quota, by product, for such deliveries. Distributors or persons other than producers may deliver on unrated orders nails, bale ties, and small black or galvanized welded pipe. The foregoing are exceptions to the rule on the A-10 rating.

New forms have been provided. To report shipments, iron and steel producers will use Form PD-138, which must be received by WPB by the 15th of the month following the month of shipment. Form PD-139 which is due on the 10th of each month must be used to report tonnages requested for delivery during that month and the following month including past due tonnage on the books of producers.

## Dairy Plants Get Rating

••• WPB on Tuesday gave domestic and Canadian owners of plants processing dairy products an A-2 rating to take care of emergency breakdowns and an A-3 rating for ordinary maintenance and repair. Neither rating may be used to obtain materials for addition or expansion of operations nor may they be used for the maintenance

or increasing of inventory levels. If materials for normal repairs are required processors must notify WPB on Form PD-414. The order expires June 30 at which time the industry will be put under PRP. Canadian operators may not use the rating unless an order is individually issued to them.

## Order on Tin Can Scrap

••• Because the shortage of scrap has resulted in increasing amounts of tin can scrap and other tin material reaching steel mills, segregation was ordered by WPB on Tuesday. Order M-24-b effective immediately prohibits mixture of any tin component in a bundle or car of scrap or delivery of a bundle or a mixed car.

If more than small controlled amounts of tin go into steel, WPB

pointed out, the product is brittle.

## Office Furniture Order

••• Limitation Order L-13-a, covering metal office furniture and equipment was amended on Tuesday by WPB to remove from the restrictions of the order all metal shelving and metal being produced under contracts placed by the Army, Navy and Maritime Commission. The amendment requires that shelving or lockers be delivered to the services or the Maritime Commission before July 15.

## Cooking Stoves Included

••• Gas cooking stoves are subject to the terms of Order L-29 covering sales of plumbing and heating equipment, it was explained Tuesday.

## Construction Permitted Under Limitation Order L-41

••• Construction projects in the future will be permitted only if authorized under one of the orders listed below, according to WPB limitation order L-41. The table below gives the types of projects which may be accorded priority assistance, the order covering the project classification, and the type of form to be filed in making the application for assistance. Proj-

ects controlled by the provisions of petroleum industry order M-68 are exempted from the provisions of L-41. Preference ratings extended on forms PD-1 or PD-1-a, or by any P order other than those listed in the following table do not constitute authorization to begin construction. WPB has stressed that order L-41 does not cover ordinary maintenance and repair work.

Rating Order Preference	Type of Construction	Application Forms	Where Filed
P-14-a P-14-b P-19 P-19-a	Shipyards and shipways.	No form.	Maritime Commission, Washington, D. C.
P-19-d P-19-g	Buildings, structures and projects important to the war effort and essential civilian needs, other than housing.	No further application accepted under P-19 and P-19-a. Apply for P-19-h or P-19-i.	
P-19-e	Publicly financed housing.	Application is made only by the federal agency principally interested in the construction.	
P-19-h P-19-i	Public roads.	Application is made by or through the Public Roads Administration of PWA.	With the field office of FHA having jurisdiction over the location of the site.
P-19-h P-19-i	Buildings, structures and projects important to the war effort and essential civilian needs other than housing.	Forms PD-200 and PD-200A.	
P-41	Construction of air transport facilities.	See Order P-41.	
P-46	Certain types of utilities construction.	See Order P-46.	
P-55 P-55 amended	Privately financed defense housing.	Form PD-105.	With the field office of FHA having jurisdiction over location of the site.
P-98	Construction related to petroleum enterprises as defined and limited therein.	See Orders in M-68 series.	
P-110	Remodeling of housing in defense areas.	Form PD-406.	With field office of FHA having jurisdiction over the location of the site.
P-115	Expansion of canning plants.	Form PD-285.	With WPB, Washington.
Certificates PD-3 } PD-3A {	Principally buildings, structures and projects owned or to be owned by the Army, Navy or certain other governmental agencies.	Form PD-3A.	With the contracting or procurement official having jurisdiction over the contract.

## This Week's Priorities and Prices

**Yellow brass scrap** revised price schedule No. 20, amendment No. 3, fixes maximum prices for all yellow brass scrap except yellow brass castings on a copper content basis. (OPA-PM 2960)

**Copper revised price schedule** 14, under amendment No. 1, permits Cincinnati Railway Supply Co. to charge premiums on lcl casting sales from its Cleveland warehouse. (OPA-PM 2966)

**Rhodium use** barred in jewelry manufacture by amendment 1 to order M-95, effective April 17. (WPB 915)

**Heavy compressors**, under order L-100, effective April 17, were placed under complete allocation. (WPB 933)

**Steel warehouses**, carrying bars and other products listed in schedules A and B of order M-21-b, may omit these products from inventory reports required by order L-63, according to exemption No. 1, effective April 17. (WPB-T 216)

**Petroleum supply house order** P-83, which provided priority ratings, revoked effective April 16. (WPB 920)

**Alloy steel specimens** of NE analyses may be shipped to laboratories or manufacturers for testing without regard to preference ratings. (WPB-894)

**Mine machinery manufacturers** operating under order P-56-A get A-1-a preference ratings. (WPB-901). Mines granted higher rating for explosives by amendment 5 to order P-56. Order P-56-A amended for broader application of priority assistance. (WPB-T206)

**Farm machinery sales and exports** in excess of quantities permitted to be manufactured is prohibited by amendment 2 to order L-26. (T-209). Four new branches set up. (WPB-T211)

**Warm air furnace manufacturers'** use of iron and steel reduced in amount by order L-22, effective April 11. (WPB-889). Warm air furnace subcommittee of plumbing and heating industry advisory committee formed. (WPB-838)

**Plumbing and heating industry committee** set up distributors' subcommittee. (WPB-877)

**Distributors' priority application form** PD-336 revised for convenience in handling. (WPB-828)

**Oil burner and stoker output** for residence use halted after May 31 by orders L-74 and L-75. (WPB-907)

**Tin plate unit** of WPB Iron and Steel Branch headed by R. F. Senter, Wheeling, W. Va. (WPB-900)

**Thirteen brass firms**, producing more than 95 per cent of the brass material used in small arms ammunition, have agreed to reduce prices of these products 1c. a lb. (OPA-PM 2983)

**Scrap ceiling violations** by Northwestern Steel and Wire Co., Sterling, Ill., and its brokers and 24 dealers were the reason for civil action being filed against the company in Chicago. (OPA-PM 2985)

**Laundry machinery output** halted by order L-91 after June 1, and dry cleaning machinery production halted after July 1 except on war orders. (WPB 936)

**Steel scrap price schedule violators** who dealt with Pittsburgh Steel Co., will be faced by OPA action. (OPA-PM 2952)

**Soil pipe schedule IV** to order L-42 amended, effective June 1, to limit manufacture of cast iron soil pipe to a single weight. (WPB-T205)

**Elevator, escalator, and dumbwaiter industry advisory committee** formed. (WPB-836)

**Gear makers** whose 1941 gross sales were less than \$5,000 exempted from reporting requirements of price schedule No. 105. (OPA-T198)

**Toy limitation order** L-81 amended to permit unrestricted use of certain oils, colors, and chemicals in coatings until June 30. (WPB-844)

• • •

*For copies of above announcements address Division of Information, WPB (or OPA), Washington, giving announcement number as shown in parentheses after each paragraph. (For example, WPB-600 means announcement 600 issued by the War Production Board.)*

## Revisions for The Iron Age Priorities Guide

• • • The following data should be added to THE IRON AGE Priorities Guide published with the issue of March 26 to bring the Guide up to date.

Under "P Orders," page 5, add:

P-56...Amendment No. 5, grants use of higher preference ratings to obtain explosives and explosive equipment for mines. (4-13-42)

P-56-a...A-1-a rating to mining machinery manufacturers, assigned to specified percentages of requirements as shown on form PD-25-A, effective second quarter. (4-14-42)

P-68...Amendment No. 3, grants A-1-c ratings for 30 per cent of steel mill repair and maintenance requirements, and A-3 on remaining 70 per cent. Related form: PD-228. (4-11-42)

P-83...Order P-83 and related form PD-82-A, assigning priority ratings to petroleum supply houses, revoked April 16.

P-95...Amendment No. 2 grants A-1-a rating to manufacturers of certain types of farm equipment and machinery, effective from April 16 to June 30. Related forms: PD-81 and PD-81-A. (4-16-42)

P-100...Interpretation No. 3, prohibits ordering uniforms and fire hose with preference rating assigned under order for repair, maintenance and operating supplies. (4-16-42)

Under "L Orders," page 12, add:

L-1-e...Stop production order after existing quotas have been completed on medium and heavy trucks for civilian use. (4-11-42)

L-22...Reduces quantities of iron and steel that may be used in manufacture of household warm air furnaces. (4-11-42)

L-26...Amendment No. 2, prohibits sale and export of farm machinery and equipment in excess of quantities permitted to be manufactured. (4-13-42)

L-54-a...Interpretation No. 2 clarifies status of privately operated plants in regard to obtainment of typewriters. (4-13-42)

L-63...Correction to include railroad supplies in preparation of form PD-336, used in connections with distributors' order L-63. (4-14-42)

L-63...Exemption No. 1, permits omission of certain products in schedules A and B of Steel Warehouse order M-21-b from

inventory reports required by order L-63, effective April 17. Related form: PD-IX.

L-74...Stop production order on manufacture of oil burners for residences, and limits production of commercial and industrial types. (4-15-42)

L-75...Stop production order on residence coal stokers and limits production on industrial type equipment. (4-15-42)

L-79...Freezes all stocks of plumbing and heating equipment except for retail sales of \$5.00 or less or for sales with A-10 ratings or better, effective April 16.

L-91...Stop production order after June 1 for laundry equipment and after July 1 for dry cleaning equipment except for Army, Navy, or Maritime Commission orders, and freezes existing equipment.

L-100...Places heavy compressors under complete allocation, prohibiting placing or acceptance of orders except on specific authorization on form PD-420. Application for authorization to be made on form PD-415.

L-102...Freezes sale, lease, or option on used electric generating equipment or steam boilers, effective April 11.

Under "M Orders," page 9, add:

M-56...Limits use of natural resins effective April 16. Quarterly inventory report form, PD-339.

M-57...Restricts use of Oiticica and tung oil, effective April 15.

M-85-a...Amendment No. 1 requires canners to provide themselves with materials necessary to adequately pack canned foods for armed forces in export boxes. (4-13-42)

M-95...Amendment No. 1 prohibits use of rhodium in jewelry manufacture. (4-17-42)

M-106...Freezes 50 per cent of all stocks of shellac of 10,000 lb. or more and 50 per cent of all future imports. (4-14-42)

M-109...Amendment No. 1 postpones report filing date on rough diamonds from April 15 to April 30. (4-13-42)

M-116...Prohibits manufacture or coating of closures with enamel on exterior surfaces where closures are made of tin or terneplate (4-4-42)



## Price Relief for Additional Beehive Operators Seen

••• Following the price concession granted last week to one Pennsylvania beehive coke oven operator, it was believed similar action will be taken to assist other producers who find the \$6 ceiling price inadequate because of production and transportation costs. However, the length of time required for the granting of concessions may force additional shut-downs. At least two small plants capable of producing 6000 tons of coke a month are already down.

The Hillman Coal & Coke Co., Pittsburgh, was permitted by OPA to charge not to exceed \$6.35 per net ton, f.o.b. ovens for beehive oven furnace coke produced at its Poland coke plant, Greene County, Pa. OPA said that the company must get suitable coal at a considerable distance from its ovens and pay attendant freight charges. The maximum prices under the coke price schedule (No. 77) is \$6, f.o.b. ovens, Connellsville, Pa.

The relief granted the Hillman Company became effective April 20 and applies to shipments made on and after Jan. 26 when the revised schedule became effective.

Figures released by OPA for the Poland plant showed total costs per net ton declined from \$6.296 in December, 1941, to \$6.324 in January, 1942; while profit margin per net ton declined from 6.2c. per ton in December, 1941, to 4.7c. in January, 1942, even though the realization price per net ton rose from \$6.358 to \$6.371 in the same length of time.

About 10 days earlier, OPA outlined the basis of procedure for beehive and byproduct operators seeking price relief (THE IRON AGE, April 16, page 98.)

### Revision in Pig Iron Order Adjusts Absorption Factor

Washington

••• Adjustments of pig iron ceiling prices when transportation costs are increased by shipments beyond the "usual market area" and other "hardship" cases were provided for by OPA last week in an amendment to the pig iron

price schedule. These shipments relate to so-called "dislocated" tonnage due to shipments made beyond "usual market areas" under WPB allocation orders. Originally, sellers were required to absorb the increased transportation costs.

Under the amendment, however, it is provided that if OPA determines that a particular shipment is outside the "usual market area" and is due to emergency conditions, the seller may charge a price not to exceed the sum of:

1. The basing point price at the established basing point at or nearest the place of origin of shipment;
2. The differentials established in the schedule, and
3. The freight charges from the basing point described in (1) to the place of delivery, as customarily computed, less \$1 per gross ton.

The term "usual market area" is defined to mean that area into which it was customary for a plant to ship pig iron in quantities comparable to shipments made before the emergency conditions arising from the present war.

Another provision permits the filing of petitions with OPA for amendment of and exceptions from the schedule, and sets up categories of cases under which the petitions may be filed. It is required that in seeking an exception it must be shown either that costs of production are so high as to make operation at ceiling prices impossible or that, in certain cases, output of pig iron may be so unprofitable as to make continued production difficult or impossible.

The amendment also revoked a section of the schedule which permitted E. & G. Brooke Iron Co., Birdsboro, Pa., to charge \$1 in addition to the ceiling price.

Simultaneously, the OPA announced that Eastern Gas & Fuel Associates, Boston, is permitted to sell pig iron produced by its selling company, the Mystic Iron Works, Everett, Mass., at \$1 per gross ton above maximum prices.

The OPA said that it found costs of the company were so high that it could not meet the costs of relining its furnace and its depreciation charges under the ceiling prices established in the pig iron schedule. However, it was added that the data studied

showed that the company could cover its direct costs. The company is at a competitive disadvantage, OPA said, because it has been cut off from its sources of foreign ores and must pay high freight charges for Lake ores.

### Ferromanganese Prices Soon

••• A formal ceiling on ferromanganese was being awaited early this week, and in its absence difficulty was encountered by some sellers in conducting business. The formal ceiling was supposed to take effect April 15. A few days earlier a meeting was held in Washington between producers and the OPA, but producers failed to learn when the announcement could be expected. Shipments to April 15 were on the basis of \$120, duty paid, seaboard, and in the case of certain Southern furnaces on the basis of \$140, f.o.b. furnace.

### Yellow Brass Scrap Prices

••• OPA has now fixed maximum prices for all yellow brass scrap except yellow brass castings on a copper content basis. The prices are set forth in Amendment No. 3 to Revised Price Schedule No. 20 (Copper and Copper Alloy Scrap), effective April 17, 1942. Highlights include:

- (1) Removal from the schedule of heavy yellow brass, cast yellow brass borings, light brass and yellow brass breakage grades and addition of a grade called refinery brass.
- (2) Establishment of a method for determining maximum prices for any kind or grade of copper scrap and copper alloy scrap not previously specified in the Feb. 27, 1942, ceiling. Some 30 kinds or grades were covered at that time.

The maximum price for the new grade is fixed at dry copper content times 9.25 cents where the assay is 60.01 per cent or more and at dry copper content times 9.00 cents where the assay is 50.01 per cent to 60.00 per cent.

The maximum price of refinery brass is somewhat below the former ceiling prices for the sorted grades of yellow brass.

In lots of less than 20 tons, refinery brass may be bought and paid for on a copper content basis determined by an estimate rather than by an assay. In such event, the price paid may not exceed 5½c. per pound of material, plus any applicable quantity premium.

To protect sellers who contracted to sell yellow brass in accord with the previous pro-

visions of the price schedule, OPA will allow such contracts to be carried out in accordance with original terms until June 1.

No. 2 or mixed heavy copper may not be sold at the base price less adjustments, if the copper content runs below 95 per cent. Likewise, light copper may not sell at the base price, less adjustments, if copper content runs below 90 per cent.

A 0.25c. per lb. penalty is required by the amendment if the top and bottom tanks of an automobile radiator have been removed before sale.



### Brass Mills Make Cut

••• Effective April 20, 13 companies, manufacturing more than 95 per cent of the brass materials used for small arms ammunition, have agreed to reduce prices on their products 1 cent a pound.

Asserting that the reduction was only "a preliminary and partial step in dealing with this whole question" of brass mill profits, the OPA said the voluntary agreement would result in substantial savings to the government which would increase steadily as production expanded.

All deliveries on and after Monday of cartridge case cups, bullet jacket cups and sheet metal produced by these companies will be affected.

One "small mill" refused to cooperate and is being investigated, OPA said, listing the cooperating firms as: American Brass Co.;

### OPA Executive Quits To Become Private

••• Arthur Oppenheimer, Jr., chief of five units in the consumer's durable goods section of OPA, has resigned to enlist as a private in the Army. He had charge of the lamps, china, silver, clocks, watches and jewelry units. He came to OPA in 1941 from Bloomingdale's in New York. He has enlisted in the Quartermaster Corps and will be stationed on Long Island.

Bridgeport Brass Co.; Bristol Brass Corp.; Chase Brass & Copper Co., Inc.; Revere Copper & Brass Co.; Riverside Metal Co.; Scovill Mfg. Co.; Seymour Mfg. Co.; Stamford Rolling Mills Co.; Waterbury Rolling Mills, Inc.; Miller Co.; New England Brass Co., and Plume & Atwood Mfg. Co.



### Copper Differential

••• Cincinnati Railway Supply Co., Cincinnati, is permitted to charge and receive premiums on casting copper sales in less-than-carload lots from its Cleveland

warehouse under Amendment No. 1 to Revised Price Schedule No. 15 (Copper). These premiums are 1 cent per pound in quantities of less than 5,000 pounds and 3/4 cent per pound in quantities up to carload, effective April 6.

OPA, in a blanket order, No. 1, to the same schedule, grants permission to carry out certain contracts to certain sellers who, prior to Aug. 12, 1941, the effective date of the schedule, had contracted to deliver or transfer copper thereafter at not more than 1/2 cent per pound over the schedules maximum prices. The order contains certain conditions, including:

- (1) Permission granted extends only until July 1, 1942. This provides a reasonable period for final completion of all such contracts.
- (2) No delivery of copper under any of the contracts is to be made unless specifically authorized by WPB.

The order has been made retroactive to March 1, in order to take care of deliveries made under these during March and April.

Sales of six concerns, including the American Metal Co., Ltd.; International Minerals & Metals Corp.; Lewin-Mathes Co.; Adolph Lewisohn & Sons, Inc.; Shattuch-Denn Mining Corp. and White Bros. Smelting Corp., to 15 different buyers are covered by the order. The quantity of copper involved under these arrangements totals 9,436,157 pounds.

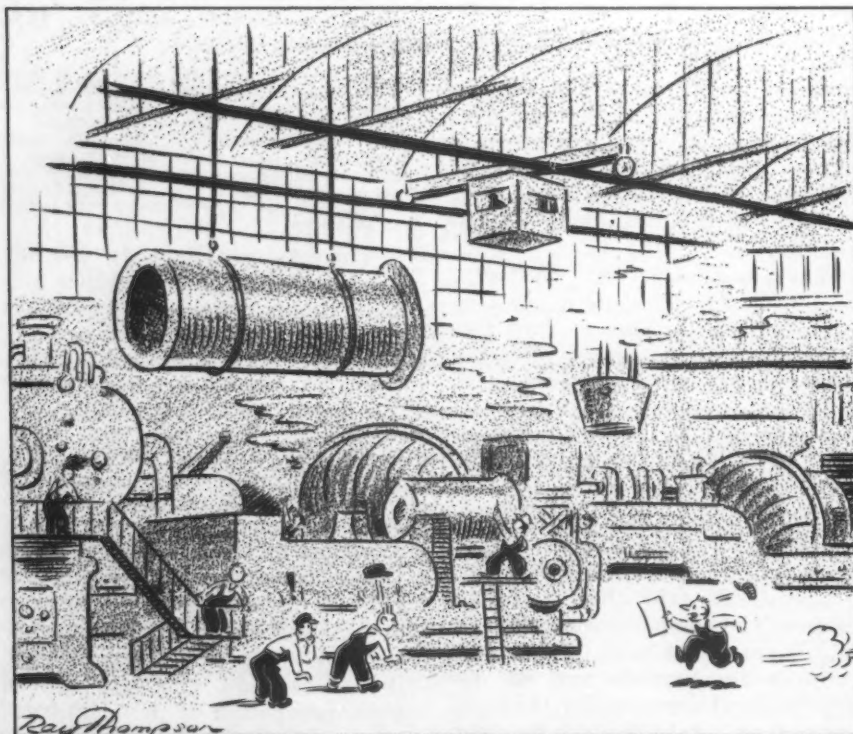


### Paint and Varnish Prices

••• Limitations of the use of certain ingredients used in paints and varnishes have exerted demand on substitute materials with subsequent price advances in this latter group. In order to check further advances in finished product prices, OPA has set a temporary schedule pending further investigation. Maximum paint and varnish prices are placed at levels prevailing on April 12. All trade practices in the nature of discounts and delivery must be maintained. The ceilings are to be held up to and including June 20.

### Company to Get All Navy "E" Pittsburgh

••• According to J. V. Smith, vice president, Hubbard & Co., the company will be granted the all Navy "E" by the Navy on April 27 and employees will be presented with Navy "E" buttons.



"Th' boss says drop what you're doin' an' hop on this Government order for ten million map pins!"



## Allegheny Ludlum to Build New Alloy Salvage Plant

Pittsburgh

••• With salvage of strategic alloy metals of supreme importance because of war conditions, even to the point of reclaiming low alloy grindings, Allegheny Ludlum Steel Corp. is building a new reclamation plant which will concentrate on the processing of low alloy steels to save the alloy content.

In order to eliminate losses of these alloys until the new equipment is in operation, the company has contracted with several other concerns which are supplementing Allegheny's present facilities for reclaiming alloy steel grindings.

The salvage of alloy metals has been standard procedure with Allegheny Ludlum since 1932 and the new building represents an all-out step in carrying reclamation to the maximum.

## Jury Appointed to Select 1941's Beautiful Bridges

••• A jury of nationally known engineers and architects has been appointed by the American Institute of Steel Construction to select the most beautiful bridges of steel built during 1941. Designs which are considered the most aesthetic solutions among monumental, medium sized, short span, and movable bridges will be decorated with a plaque to be affixed with appropriate ceremonies.

The jury will make its selections from photographs, and builders and owners are requested to submit photographs of structures not later than May 1. Data accompanying the photographs should include bridge name, location, cost, engineer, fabricator, owner, completion date, opening date, span length, and roadway width.

## Chicago Defense Pool Obtains Prime Contract

Chicago

••• First prime contract to be awarded to a diversified pool of manufacturers has been obtained by Chicago Defense Associations, a group of 120 firms. The ordnance contract involves screw machinery only and will provide work for those members of the pool having these machines through December.

## Second Large Ore Carrier Launched Near Detroit

Detroit

••• The second of five giant ore carriers being built for the Pittsburgh Steamship Co., United States Steel subsidiary, was launched at the River Rouge shipyards of the Great Lakes Engineering Works at Ecorse, near Detroit, last Saturday. The vessel was christened the Enders M. Voorhees, and was sponsored by Mrs. Voorhees, wife of the chairman of the finance committee of the United States Steel Corp.

This vessel and its four sister ships are the largest ever built on the Great Lakes. When all are completed they will add a maximum total of 93,000 long tons of single trip ore-carrying capacity to the Pittsburgh Steamship Co. fleet, which already is the largest on the Lakes. Each ship has a total length of 639 ft., a breadth of 67 ft. and a depth of 35 ft.

## 7 New Furnaces for American Brake Shoe

Pittsburgh

••• Seven car-type heat treating furnaces for American Manganese Steel Division of American Brake Shoe & Foundry Co. are being constructed at St. Louis, Mo., by The Rust Furnace Co., Pittsburgh, Pa. Construction was begun only six weeks after The Rust Co. received a rush order for design and building of the furnaces.

## Fisher Body Steps Up Gun Breech Housing Output

Detroit

••• Fisher Body Division of General Motors Corp. has signed contracts with the Navy for greatly augmented output of gun breech housings. A step-up of nearly 300 per cent in production one type, and 250 per cent on another is called for in the contract, and one entire plant is being turned over to this job.

## Allison-Cadillac Machine Tool Comparison

••• The machine tool industry has been particularly interested in technical aspects of the General Motors presentation recently in refutation of the Reuther plan.

GM has two complete examples where airplane motors are now in quantity production by automotive engine manufacturers and, as stated by C. E. Wilson, GM president, "We actually know the degree to which machines could be retooled." He referred to the quantity production of the Allison engine and the Pratt & Whitney

radial air-cooled engine which is now being made by Buick and Chevrolet. The data are presented in tabular form.

	New Machines	Used Machines	Total	% Used to Total
5 Allison Parts at Cadillac	318	93	411	22.6
Buick Pratt & Whitney Flint Melrose Park	3914	1047	4961	21.1
Chevrolet Pratt & Whitney Buffalo Tonawanda	2661	872	3733	23.3

	Crank-shaft	Cam-shaft	Connect-ing Rod	Wrist Pin	Super-Charger Vane	TOTAL	
1. New machines required for Allison parts.....	89	56	124	14	35	318	318
2. Machines required to produce corresponding Cadillac part.....	38	18	41	7	No corresponding Cadillac Part	104	...
3. Machines obtained from General Motors or Cadillac for Allison parts...	14	10	11	6	5	46	93
4. Additional machines usable on Allison if Cadillac production had been stopped completely.....	18 5 limited to roughing work only	8	18	3	...	47	
5. Dollar value of—							
a. Total Allison machines.....	\$829,791	\$274,020	\$802,318	\$76,403	\$204,870	\$2,187,402	...
b. Total Cadillac machines (for corresponding parts).....	\$213,398	\$72,596	\$133,907	\$30,913	...	\$450,814	...

# PERSONALS . . .

• **W. D. Fisher** has been made Detroit sales representative and tool engineer for McKenna Metals Co., Latrobe, Pa. Mr. Fisher had been associated for 17 years with Vanadium Alloys Steel Co. as sales representative in the Michigan territory.

• **Max M. Gilman** has resigned as president of the Packard Motor Car Co. A successor to Mr. Gilman is expected to be named at the stockholders' meeting this month.

• **R. R. Morrison**, a Dodge executive since 1910, has been named works manager of Dodge plants of Chrysler Corp. **Otto Franke** has been appointed general works manager of the Dodge division of Chrysler. Mr. Morrison was active in 1917 in the conversion of Dodge activities to war production. After the last war, he was made head of the Dodge plant inspection department, from which he was promoted in 1940 to be assistant works manager. Mr. Franke has been general master mechanic of Dodge for the past two years and for nine earlier years was master mechanic of Plymouth.

• **Benjamin M. Smarr** has been made director of purchases of Aviation Corp., attached to the operations staff at the Detroit divisional office. Mr. Smarr has had 25 years experience in the automotive industry, starting with Lincoln Motor Car Co. as a trouble shooter on Liberty engines during World War I. From there he went to the Central Axle division of General Motors Corp. as specification engineer in 1920. Two years later he was transferred to GM Central Office in Detroit where he has served continuously.

• **V. P. Black** has been named to direct the activities of the price and order department of the Airtemp Division of Chrysler Corp. He succeeds Carl Henze, who met with a fatal accident recently. Mr. Black, who has been advertising manager, will continue in that post and will also handle the affairs of the Airtemp Construction Corp.

• **George W. Mason**, president of Nash-Kelvinator Corp., has been elected a director of Square D Co.,

Milwaukee, in the place of F. Eberstadt, who has resigned to assume a United States governmental post. Mr. Mason co-ordinated the activities of Rock Island Arsenal during the first World War and at present has seven plants carrying out war production programs.

• **Roger M. Daugherty** has been named vice-president and chief engineer of the defense division of the Detrola Corp. Daugherty went to the Detrola Corp. from the Crosley Corp. He has been active in every phase of the communications field, including engineering, designing, manufacture, sales and distribution.

• **Edward Riley**, automotive engineer with nearly 20 years' experience in engine, body and chassis design has joined the staff of the Automotive Council for War Production and has been assigned to the Tank, Combat Car and Parts Division.

• **Harold P. Wade**, former executive engineer for Packard and Chrysler, is the new head of the Adel Precision Products Corp., new Detroit engineering office.

• **J. A. Wilkin** has been named district sales manager in the southeastern states for Champion Spark Plug Co., Detroit. He formerly was territory representative in southern Ohio and replaces **W. F. Radbone** whose retirement was forced by ill health. **George Owens**, formerly of Baltimore, has taken over southern Ohio and is, in turn, replaced by **M. F. Reese**. **W. L. Barnes** has been appointed San Francisco representative. **J. J. Nopper**, formerly on special assignment with the oil industry has been appointed territorial representative in Minneapolis, replacing **U. H. Johnson**, retired.

• **P. D. Higgins**, for 16 years with the Toastmaster Products division of the McGraw Electric Co., has accepted an appointment as director of purchases for the Mills Novelty Co. **R. D. Scheldrup**, who has been with McGraw 15 years, succeeds him as purchasing agent. **Harry B. Davis**, currently assistant to the sales manager, has been named to succeed Mr. Scheldrup.



**W. V. PETERS**, vice-president, Truscon Steel Co., Youngstown.

• **W. V. Peters**, sales manager since 1937, has been made vice-president and elected a director of the Truscon Steel Co., Youngstown, subsidiary of Republic Steel Corp., succeeding **Kenneth D. Mann** who leaves Truscon to serve in Washington under General Brehon Somervell, services of supply command, U. S. Army. **C. B. McGehee** has been named general manager of sales.

• **J. H. Matthews** and **O. H. Cilley** were elected to the board of directors of Raybestos-Manhattan, Inc., Passaic, N. J. Mr. Matthews is assistant general manager of the Manhattan Rubber Mfg. division, Passaic, N. J., and Mr. Cilley is assistant general manager of the United States Asbestos division, Manheim, Pa., both of Raybestos-Manhattan, Inc.

• **Charles J. Hardy** has been elected chairman of the board of the J. G. Brill Co., New York, and **Leslie E. Hess** has been named president. Other officers elected were: **Charles O. Guernsey** and **Ronald R. Monroe**, vice-presidents; **Edmund L. Oerter**, secretary-treasurer; **J. W. Robb** and **B. D. F. Baird**, assistant treasurers, and **H. F. McKillip**, assistant secretary.

• **Walter O. Briggs, Jr.**, has been named treasurer of the Briggs





**J. K. FULKS**, vice-president in charge of operations, Ex-Cell-O Corp., Detroit.



**R. W. THRASHER**, plant superintendent, Scaife Co., Oakmont, Pa.



**S. J. HORRELL**, vice-president of Associated Piping & Engineering, Ltd., Los Angeles.

Mfg. Co., Detroit, succeeding Robert Pierce, who resigned as treasurer last February. A. D. Blackwood has been named secretary of the Briggs Co. to fill the vacancy caused by the recent death of H. W. Griffith.

- **James K. Fulks** has been appointed vice-president in charge of manufacturing of Ex-Cell-O Corp., Detroit. Mr. Fulks joined the company in 1925 and has been engaged in all phases of the company's production of precision machine tools and parts. Since September, 1940, he has been in charge of several of the Ex-Cell-O plants, now entirely engaged in war work.

- **Norman Thompson**, formerly general superintendent of Republic Steel Corp.'s ore mines in the Birmingham district, has been promoted to assistant general superintendent of Republic's Birmingham division, a new position. Mr. Thompson has served as assistant and chief engineer for the corporation's ore mines in the Birmingham area, superintendent of Spaulding and Raimund ore mines and superintendent of Sayreton coal mine.

- **J. C. Shaw**, aircraft engineer, has been made head of the engineering work of a new aircrafts products division at Young Radiator Co., Racine, Wis., which will

be under the supervision of J. J. Hilt, vice-president, to handle the increased development of various units needed for airplane construction.

- **A. V. Murray**, for the past several years secretary of the Scaife Co., Oakmont, Pa., has been elected executive vice-president. **R. G. Taylor** has been made secretary, and **R. W. Thrasher** has been named new plant superintendent.

- **H. E. Doughty** has been appointed assistant sales manager of Jessop Steel Co., Washington, Pa. Formerly district manager at Philadelphia, Mr. Doughty's new position was created by a program of expansion.

- **Osborne Bezanson**, general manager of the Texas division of Monsanto Chemical Co., has been elected a vice-president. Mr. Bezanson was employed by the Merrimac Chemical Co. in Everett after his graduation from high school. After four years as a laboratory assistant, he was made a department superintendent in 1910, continuing in this position until 1918 when he was made assistant to the president. Later he was made works manager and vice-president. In 1929, after the Merrimac Co. was taken over by Monsanto, he was promoted to the position of production manager of the Merrimac division. Early this year he was made general man-

ager of the Texas division, which has under its jurisdiction a plant for the manufacture of an important raw material for synthetic rubber, and a major plant for the manufacture of munitions.

- **S. J. Horrell** has been appointed vice-president of Associated Piping & Engineering, Ltd., Los Angeles. Mr. Horrell was formerly associated with the Blaw Knox Co., Pittsburgh, as vice-president of its Power Piping division in charge of sales and engineering. He was also active for many years with the Grinnell Co., Providence, R. I.

- **Clarence W. Krueger** has been appointed sales manager of Whitman & Barnes with headquarters in Detroit. **George W. Clarkson** has been named to fill Mr. Krueger's former position as manager of Whitman & Barnes' New York sales office.

- **Fred W. Cederleaf** has been named plant manager of the two Detroit plants of Republic Aircraft Products division of the Aviation Corp. Mr. Cederleaf was formerly connected with the Dodge Mfg. Corp., Mishawaka, Ind., where he served as works manager for the past three years. Prior to that he was manager of the machinery division of the Ex-Cell-O Corp., as consulting engineer of the A-C Spark Plug Divi-

sion, assistant works manager of the Olds Motor Works, works manager of the Muncie Products Division, manufacturing research manager of the Buick Motor Division, and manager of Central Standards of General Motors of Canada.

- **William E. Boeing**, pioneer aircraft builder who founded the Boeing Aircraft Co. more than a quarter century ago, has offered his services for the duration of the war to the company he once headed. Mr. Boeing will act in an advisory capacity, in a personal desire to gratuitously contribute his energies to the nation's war effort. Mr. Boeing retired from the chairmanship of the Boeing company eight years ago and has since maintained no connection with the business, neither he nor any member of his family having any present stock interest in the company.

- **P. W. Stansfield**, manager since 1939 of the farm service tire sales of the B. F. Goodrich Co., Akron, Ohio, has been given the added duties of directing the sale of industrial tires.

- **Marion P. Crews**, former CAA official has been appointed to the post of Dayton representative of Boeing Airplane Co. and Boeing Aircraft Co. A veteran of 14 years' experience in aeronautical engineering, Mr. Crews will serve as liaison man for all branches of the Boeing companies with the material division of the Air Corps, handling both business and engineering relationships.

- **Hugo Weissbrodt** has been named chief of field operations for the War Production Board, Detroit Region. He has been on the WPB automotive branch staff since February when he was drafted by Ernest Kanzler to be chief of the Procurement and Expediting Section. He was called into the government service from his job as general manager of International Harvester Co., Springfield, Ohio. He replaces **Warren H. Clarke** who had headed the Contract Distribution Branch since March, 1941.

- **Wayland S. Bowser** has been appointed comptroller of the Blaw-Knox Co., Pittsburgh. He formerly was in the comptroller's office of Carnegie-Illinois Steel Corp. and prior to his association with this company, was in charge of office and accounting methods at Koppers Co. for six years.

## OBITUARY . . .

- **George L. Norris**, chief metallurgist of the Vanadium Corp. of America, New York, died at Roosevelt Hospital, New York, April 13. He was 76 years old. He was one of the pioneers in the development and application of vanadium. He joined the American Vanadium Co. in 1909 and remained with this company when it became the Vanadium Corp. of America. He was in active service until the time of his death.

- **S. F. Laucks**, president of the York Safe & Lock Co., York, Pa., died April 11. He was 72 years old. Mr. Laucks is credited with formulating the York plan of industrial subcontracting by which small factories assisted in war production.

- **William T. Kyle**, sales manager of the C. O. Jelliff Mfg. Corp., Providence, died March 27.

- **John Woodward**, president of the Leetonia Boiler Co., Leetonia, Ohio, died suddenly on April 1, aged 78 years.

- **Fred J. Maeurer**, for the past 13 years associated with the Air Reduction Sales Co., New York, in the applied engineering department, died suddenly on April 13. Mr. Maeurer had been connected with Airco since 1922, when the company acquired the Davis-Bournonville Co., with whom he had been employed since 1909.

- **John Henry Main**, a former purchasing agent for the General Motors Corp. and Cadillac Motor Co., and recently office manager of the Carey Roofing Co., Akron, Ohio, died recently, aged 64 years.

- **Williston A. Keen**, president of the Metalwood Mfg. Co., and vice-president of the Detroit Oak Belting Co., died recently in Detroit. He was 73 years old.

- **George H. E. Petersen**, an automotive engineer and production manager of the early Paige Motor Car Co., died recently, aged 62 years. Mr. Petersen's association with the original Graham-Paige Co. continued through various changes for 32 years until the time of his death. He was one of the five founders of the company.

- **Howard H. Fisher**, youngest of the seven Fisher brothers of Detroit, whose careers have been

closely associated with the automobile industry, was buried April 4. He was 40 years old and was affiliated with the Fisher Body Corp. and its subsidiaries. The death was the second among the seven brothers within a year, Fred J. Fisher, the eldest, having died in July, 1941.

- **Charles J. Adamson**, 61 years old, engineer for the Mueller Brass Co., Port Huron, Mich., and a former marine engineer, died April 7.

- **Walter M. Gorham**, senior partner of Henry Levis & Co., Philadelphia, died on April 12 after several months' illness.

- **Percy Child Idell**, for many years sales manager for Babcock & Wilcox, New York boiler manufacturers, died recently, aged 63 years.

- **John E. Kelley**, retired, and for nearly 30 years sales manager of the Simonds Saw & Steel Co., died at his winter home in Florida April 17. He was active in establishing the company's South American, Philippine and Egyptian branches.

- **John Gifford**, production manager of the Sexton Can Co., Everett, Mass., died suddenly April 17. He was 39 years old.

- **Daniel C. Roloff**, of the South West Machine Co., Wausau, Wis., died suddenly after an emergency operation. He was manager of the local WPB office.

- **August Kinder**, veteran foundry official with the Badger Meter Mfg. Co., Milwaukee, died April 13 after a short illness.

- **William M. Ziegler**, operator of the William M. Ziegler Tool Co., Detroit, since 1931, was buried April 16. Born in Saxony, Germany, 61 years ago, Mr. Ziegler had lived in this country 55 years. He was educated in Cincinnati and started in the tool business there 37 years ago.

- **Frank Clark**, transportation manager for the Kingsbury Ordnance plant at LaPorte, Ind., died recently. Mr. Clark was employed for 20 years by the Detroit Street Railway System as a master mechanic. In 1941 he was given a leave of absence to serve the ordnance plant.



# NON-FERROUS METALS

... MARKET ACTIVITIES AND PRICE TRENDS

## WPB to Make Survey of Metal Stocks and Needs

... WPB is beginning a complete survey of the use of all metal in the United States during first quarter of 1942 and of expected requirements for third quarter. The survey will be made by questionnaire, which will be mailed to all users of metal in raw or fabricated form, and will be in the form of PD-275. The survey will cover, in addition to manufacturers who use metal in their products, mines, railroads, shipyards, utilities, petroleum industry, and military and naval contractors. It must be returned to the Bureau of the Census by May 15. The metals and products listed on PD-275 are the same as the metal section of the Materials List No. 1 of form PD-25-a, used for filing applications under the Production Requirements Plan.

"Survival" is the main worry of wholesale distributors and importers of tin, because of the complete control held by the Government over domestic supplies plus the fact that very little refined tin is coming into the country through normal channels. Faced with almost certain extinction, these businesses are quickly approaching a crisis. Many individual members of the firms have long since left and obtained jobs in Washington.

One plan forwarded by the tin interests themselves to the Government was that their services be used in distributing under WPB direction the tin that is now in MRC and Government stockpiles and the metal that will soon be forthcoming from the new Texas City, Tex., smelter.

As far as can be learned, however, neither MRC nor WPB are in approval of such a plan, and for the time being at least the long experience of these firms will not be utilized in the present war efforts. It seems hardly possible that the services of these companies, who have in the past rendered such excellent service, should be dispensed with completely.

Of further interest in the tin fields is the fact that a representa-

tive of Bolivian miners has appealed to the United States Government for a higher price for tin. Since the tin contract was signed with MRC on Nov. 4, 1940, production costs have risen, according to the Miners' Coordination Committee, which represents all classes of miners in Bolivia. Contributing factors have been increased shipping rates and higher insurance premiums because of the war; higher labor and equipment costs; and higher prices paid for food and necessities imported from the United States.

The Bolivian Government has decreed that youths working in the mines will not be conscripted for military service, but the pressing labor problem that acts as a brake on increased tin ore production is not expected to be solved by the action.

As drawstrings tighten around

supplies of metals for civilian use, probably the hardest hit to date are the fabricators of products that have heretofore used copper. WPB is after all copper in the hands of fabricators and consumers classified as "frozen," and from all appearances, more producers will come under that classification shortly. The report that a corporation under the RFC was being set up to handle these stocks of frozen copper has not yet been verified, but with or without a separate division for this work, it is assured that these stocks will soon start moving into the Government's fold.

A 20-mile copper belt extending between Stafford and Corinth, in Vermont, last worked some 15 years ago, will be reopened by a new corporation, the Vermont Copper Co., Inc., it was announced by WPB.

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**"HERCULES" (RED STRAND) WIRE ROPE**  
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# MACHINE TOOLS

... SALES, INQUIRIES AND MARKET NEWS

## Dealers Straighten Out Orders After March Deluge

Cleveland

••• After the deluge of orders of a few weeks ago, machine tool dealers have settled down to the routine of securing supplementary data to complete most orders that had been hastily placed during the last few days of March. This has necessitated much overtime work by the clerical staffs in the offices of dealers, plus considerable correspondence and long distance telephoning to straighten out various uncertainties.

The peak in demand for machine tools by the auto industry to be used in its conversion into war work appears to have been passed, and more recent orders have been at a relatively moderate rate. Meanwhile, orders are expected to be forthcoming in the very near future from stove manufacturers, producers of electrical appliances, and miscellaneous consumers' products, as these firms manage to secure war orders. Some of these companies have been comparatively slow in getting into war work and this accounts for their failure to have ordered munitions producing equipment by this time.

Machine tool dealers and representatives of producers have been cooperating with the Cleveland Ordnance Office in making their experience and engineering knowl-

edge available to Army officers. At the present time, there are regular weekly meetings between the dealers and Army men.

## Bullet Core Lathe Held Up

Chicago

••• The special adaptation of a 10-in. engine lathe for mass production of bullet cores detailed in THE IRON AGE of April 2 has run into temporary difficulties. It is understood that the Ordnance Department is looking for available unused multiple-spindle facilities in this district before it gives its official o.k. to the new machine. Ordnance believes it will be able to locate facilities which will do the job faster than the small special lathe. Whether this equipment can be located in the Midwest is problematical. In the meantime, production of the special equipment is held up.

The machine was designed at the instigation of the Chicago branch Office of Contract Distribution. It is supposed to sell at about \$1000 and was to be sold to small shops, garage repairmen, etc. Reports have been heard that its trial run showed it would turn out only two cores a minute, about one-half the figure expected. It has also been said that the machine was not as simple to operate as originally claimed; but when THE IRON AGE witnessed the trial

run-off, it was clearly evident that an unskilled man or woman could be taught to operate the lathe in two hours at the most. Actually, it is likely that the special lathe will be modified so that it can be made to turn out cores fast enough to meet requirements.

## Study Employment of Women

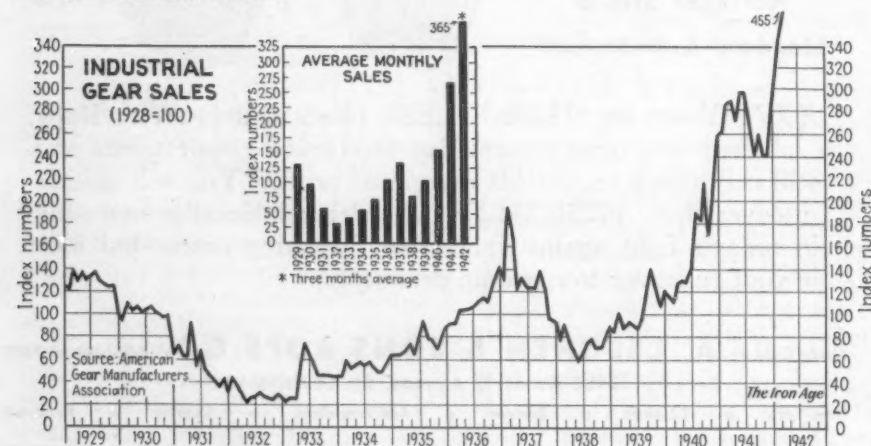
Cincinnati

••• While none of the district machine tool shops have yet employed women to operate their machines, the matter is receiving more than passing interest. One or two small shops, manufacturing light tools and a few shops manufacturing related items, have women working in their machine shops, but so far in the machine tool industry generally, a few plants have only employed women in stock rooms, tool cribs and for messenger service. One company is reported about to inaugurate a class for women to train them to work in the shops, while others are contemplating extension of the learner system to include women. Of course, the training and employing of women will make it necessary for plants to provide separate locker rooms and other welfare facilities for convenience of women in the shop, which, of course, has heretofore been only prepared to accommodate men.

On the new business side of the picture, no change is reported and order books continue to be crammed with new business.

## March Gear Sales Set New Record

••• Industrial gear sales in March rose to a new high of 455, according to the index of sales compiled by the American Gear Manufacturers' Association. The index for the preceding month stood at 353, while the high point of 1941 was 299 recorded in June.



## 5 New Republic Furnaces to Have 2,200,000-ton Capacity

Cleveland

••• Scrap shortages reduced Republic Steel's ingot output during the last five months by 150,000 tons, according to Charles M. White, vice-president in charge of operations. However, the company expects that its plans to construct five new blast furnaces, increasing annual pig iron capacity by 2,200,000 tons, will go far toward offsetting the scrap insufficiency. One of the new furnaces will be ready for operation in May.





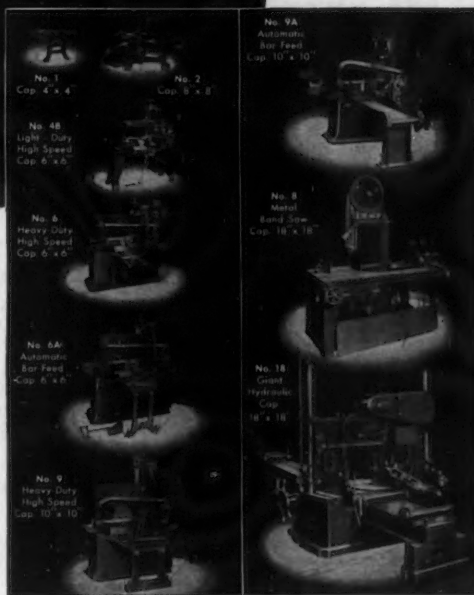
# MARVEL SAWS

## handle orders as they come, at Jones & Laughlin Warehouse



**Top:** No. 9A MARVEL Production Saw automatically cutting-off quantity run—3 bars at a time. This heavy-duty all-ball-bearing machine cannot be surpassed in speed, simplicity, ruggedness and dependability.

**Below:** A universal No. 8 MARVEL Metal-cutting Band Saw, that cuts-off, miters, notches or cuts at any angle from 45° right to 45° left. Blade feeds into the work.



Hot rolled and cold finished steel squares, rounds, hexagons and flats—single pieces or hundreds of pieces, lengths or slices, small bars or large (to 18" x 18") are cut off quickly, accurately and efficiently at the Jones & Laughlin Steel Corp. Detroit Warehouse with MARVEL SAWS. "We are very pleased with all machines" sums up their MARVEL experience.

**ARMSTRONG-BLUM MFG. CO.**

"The Hack Saw People"

5700 Bloomingdale Ave., Chicago, U.S.A.  
Eastern Sales Office: 225 Lafayette St., New York

# SCRAP

... MARKET ACTIVITIES AND QUOTATION TRENDS

## OPA Goes to Courts To Enforce Ceilings

... Inaugurating a series of actions designed to insure an "orderly" scrap market, OPA during the past week began court actions against Pittsburgh Steel Co. and Northwestern Steel & Wire Co. In the latter suit a broker and 24 dealers also were cited.

"These actions are only the first of a series we are preparing to take throughout the nation," commented Leon Henderson, OPA administrator. He asserted "appropriate action" will be taken against those Southwestern dealers and brokers who are found to have violated the OPA iron and steel scrap price schedule in their dealings with Pittsburgh Steel Co.

OPA's complaint against Pitts-

burgh Steel alleged that the company had been buying unprepared scrap in the Southwest and paying maximum prices for prepared scrap. A temporary restraining order was issued by Federal Court at Pittsburgh, with Friday, April 24, set for argument on a preliminary injunction. J. H. Carter, president of the company, said the injunction proceedings were based on transactions in March when regulations were not clear. The questionable matters were cleared up April 2, he said, "and since that time we have been fully complying with the new regulations."

At Pittsburgh Tuesday it was learned officials of Pittsburgh Steel have been in discussion with OPA on the citation and it was believed possible that an agreement might be reached which would make unnecessary the court hearing scheduled for April 24.

In a civil action in Chicago, Northwestern Steel & Wire Co. of

## Ford to Dig Up Rail Buried in Canada

Detroit

... At Windsor, Ont., across the river from Detroit, 2600 tons of steel rails buried in the streets following abandonment of street car service will be turned over to Ford Motor Co. of Canada for conversion into war material. Ford will pay for the job of digging up the rails and preparing them for use.

Sterling, Ill., and a broker, M. S. Kaplan Co. of Chicago, were charged with buying and accepting scrap at prices in excess of established levels, while the 24 dealers were charged with selling and delivering at prices above the established maximums. It is understood this action also is based on inspections made in March.

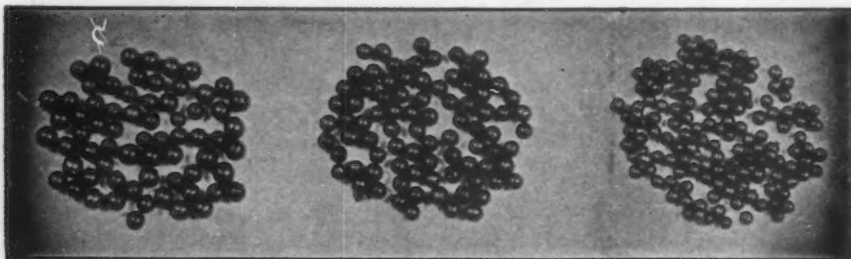
OPA charged all 26 defendants with "upgrading." The 26 were also charged with failing to keep complete and accurate records as required in the price schedule. The OPA request for an injunction was set for hearing April 28.

OPA men asserted bottom layers in loaded cars were found inferior to invoiced grades.

The 24 dealers named in the civil action are:

Advance Steel Salvage Corp., Chicago; Alter Co., Davenport, Ia.; Max Falk, doing business as American Auto Parts Co., Sioux City, Ia.; Atlas Iron & Metal Co., Joliet; Morris Pollock, doing business as Aurora Auto Wrecking Co., Aurora, Ill.; Morris Max Blum, doing business as Blum Iron & Metal Co., Dubuque, Ia.; Central Paper Stock Co., Chicago; Consumers Steel & Supply Co., Racine, Wis.; I. W. Kaufman, Kansas City, Mo.; General Iron & Metal Co., Chicago; Henry M. Cohen, doing business as Co-Henry Co., Kansas City, Mo.; Mary Bodow, doing business as Southwest Iron & Metal Co., Kansas City, Mo.; Abe L. Pekarsky, doing business as Kishwaukee Auto Parts & Wrecking Co., Rockford, Ill.; Light Bros. & Co., Sioux Falls, S. D.; John A. Robinson, doing business as Norfolk Hide & Metal Co., Norfolk, Neb.; J. H. Krause, Inc., Rockford, Ill.; Marmis & Solomon, Dubuque, Ia.; Miller Bros. Iron & Metal Co., Milwaukee, Wis.; Miller Iron & Metal Co., Chicago; Newton Iron & Metal Co., Ottawa, Ill.; H. Pitts & Co., Sioux Falls, S. D.; Rothstein Iron & Metal Co., Freeport, Ill.; Southern Illinois Scrap Iron & Metal Co., Harrisburg, Ill.; Wolf Bros., Inc., Mason City, Ia.

At the start of this week, the scrap supply picture appeared brightening at several critical spots. Republic Steel planned to add two open hearths at Warren, Ohio. Favorable weather has permitted railroads to increase their



HEAT-TREATED STEEL SHOT

## We manufacture shot and grit for endurance

A shot or grit that will blast fast with a clean finish.

This is the only reason why so many operators are daily changing to our shot and grit, from Maine to California.

The unprecedented demand for our—

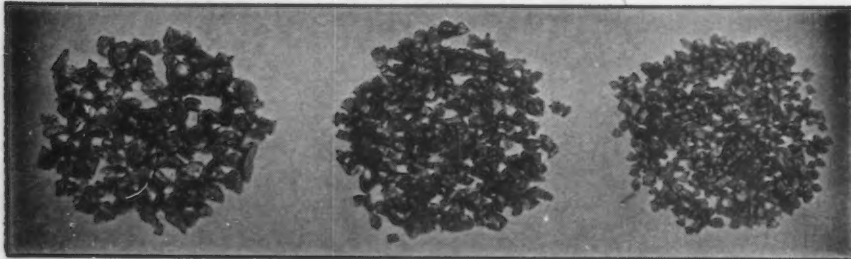
## HARRISON ABRASIVE CORPORATION

HEAT-TREATED STEEL GRIT

MANCHESTER, NEW HAMPSHIRE

### Heat-Treated Steel Shot and Heat-Treated Steel Grit

has enabled us to expand our production and maintain a quality that is more than satisfactory to our hundreds of customers all over the country.





scrap collections a little; slag dump "mining" operations are increasing, and public scrap drives are still making valuable contributions. At Buffalo it is reported the local drive has uncovered 65,000 tons, including 23,000 tons from one single unnamed project.

**BUFFALO**—The local drive to round up scrap has "uncovered" 65,000 tons, drive officials announced recently. One single "project" (unnamed) will yield 23,000 tons. Despite a shortage of trucks and minor labor difficulties, the area's largest steel plant has managed to add a few thousand tons to its reserve scrap pile. Dealers are shipping their tin cans by rail to Hamilton, Ont.

**CLEVELAND**—The scrap situation continues improving here, although this is no indication as yet that the mills will be able to accumulate enough scrap to build up an adequate reserve supply for the 1942-43 winter. This week Republic will place two additional open hearths in operation in Warren with the aid of a better scrap supply situation there. Republic still has three units idle in Youngstown. Some turnings have been shipped to open hearths at the blast furnace price.

**CHICAGO** — In connection with the OPA injunction proceedings naming Northwestern Steel & Wire Co., a broker and 24 dealers, THE IRON AGE has learned the suit is based on inspection of cars at the plant during one of the early weeks in March.

**ST. LOUIS**—More and better scrap has enabled an increase of ingot operations to 93 per cent. Granite City Steel Co. is now back to nine active open hearths operations. Allocations have been made for the benefit of Granite City, Laclede Steel Co., and General Steel Casting.

## Inspectors Unfair, Wreckers Complain

Cleveland

••• A check into the reaction of several auto graveyard owners regarding the effort to speed-up scrap operations discloses their belief that the handling of this drive leaves much to be desired. Wreckers contend the scrap dealers who visit them periodically to make inventory checks apparently do not know the difference between scrap and spare parts. Inspectors making periodic counts of the number of old cars standing in graveyards fail to allow for the number scrapped since previous visits, and the number purchased from time

to time, it is said. Owners of useless cars apparently expect to receive the widely quoted \$20-a-ton price.

Graveyard owners were particularly resentful at the attitude of WPB representatives, who are largely scrap dealers or brokers, claiming these visitors apparently make no allowance for the investment represented in the usable spare parts inventories and generally regard all the metal on the premises as scrap. One graveyard owner said he had cleaned out and sold as scrap 33 tons out of his 43-ton inventory of motor blocks, and 11 tons out of his 15-ton inventory of springs. Despite this, inspectors subsequently regarded his motor block and spring inventory as scrap.

It is true some recalcitrant yard owners have anywhere from 4000 to 6000 cars standing although many of them are definitely of no value whatsoever except as scrap. In addition, some in the business have large inventories of used parts, which in reality are practically worthless.

## New England Scrap Study May Indicate Broad Trends

Washington

••• Comparison of the flow of iron and steel scrap in New England before and after prices were fixed under Price Schedule No. 4 will be made by OPA. It is expected the New England area will exhibit many characteristics common to other scrap producing regions and that, if so, it may be possible to apply results broadly.

## Republic Mining Buffalo Slag

••• Republic Steel Corp. has contracted for the recovery of waste steel from its Buffalo slag dumps, rich in steel content. Workmen using steam shovels and a magnetic separator are going over 1,000,000 tons of refuse, "mining" the steel discarded years ago when inefficient methods were responsible for off-heats being discarded the same as slag. Clarence A. Hackett, mayor of Tonawanda, N. Y., is the contractor.

(Turn Page for Scrap Prices)



It's a good spring that wears out from old age. Many springs may grow old before their time because of unnoticed surface defects. Burrs, seams, pitting, cracks—all contribute to early spring failure—unless care in manufacture and laboratory inspection weeds them out. Surface defects often invite corrosion—also a contributing factor to a short life. Here at Dunbar's, spring materials are inspected, analyzed—before manufacture. All the way through, great pains are taken to waylay defects before they reach your assembly line. It's just this kind of care that earns for Dunbar a reputation for springs of better quality—long life.

"Quality Springs Since 1845"

**Dunbar Bros. Co., Bristol, Connecticut**

DIVISION OF ASSOCIATED SPRING CORPORATION

## SCRAP PRICES

(All the prices given below are per gross tons and are basing point prices from which shipping point prices and consumer's delivered prices are to be computed)

### IRON AND STEEL (OTHER THAN RAILROAD) SCRAP

	BASIC OPEN HEARTH GRADES (No. 1 Heavy Melting; No. 1 Hydr. Com- pressed Black Sheets; No. 2 Heavy Melting; Dealers' No. 1 Bundles; Dealers' No. 2 Bundles; No. 1 Busheling)			Machine Shop Turnings	BLAST FURNACE GRADES (Mixed Borings and Turnings; Shovelling Turnings; No. 2 Busheling; Cast Iron Borings)		ELECTRIC FURNACE, ACID OPEN HEARTH AND FOUNDRY GRADES										
						Low Phos.			Heavy Structural and Plate			Cut Auto. Steel Scrap			Alloy free Low Phos. and Sulphur Turnings	Heavy Axle and Forge Turn. First Cut	Electric Furnace Bundles
						Billet, Bloom, Forge Crops	Bar Crops and Smaller	Punch- ings and Plate	3 ft. and Under	2 ft. and Under	1 ft. and Under	3 ft. and Under	2 ft. and Under	1 ft. and Under			
Pittsburgh, Brackenridge, Butler, Monessen, Midland, Johnstown, Sharon, Canton, Steubenville, Warren, Youngstown, Weirton.....	\$20.00	\$16.00		\$16.00		\$25.00	\$22.50	\$22.50	\$21.00	\$21.50	\$22.00	\$20.00	\$20.50	\$21.00	\$18.00	\$19.50	\$21.00
Cleveland, Middletown, Cincinnati, Portsmouth.....	19.50	15.50		15.50		24.50	22.00	22.00	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50
Chicago, Claymont, Coatesville, Conshohocken, Harrisburg, Phoenixville, Sparrows Pt....	18.75	14.75		14.75		23.75	21.25	21.25	19.75	20.25	20.75	18.75	19.25	19.75	16.75	18.25	19.75
Ashland, Ky.....	19.50	15.50		15.50		24.50	22.00	22.00	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50
Buffalo, N. Y.....	19.25	15.25		15.25		24.25	21.75	21.75	20.25	20.75	21.25	19.25	19.75	20.25	17.25	18.75	20.25
Bethlehem, Pa.; Kokomo, Ind..	18.25	14.25		14.25		23.25	20.75	20.75	19.25	19.75	20.25	18.25	18.75	19.25	16.25	17.75	19.25
Duluth, Minn.....	18.00	14.00		14.00		23.00	20.50	20.50	19.00	19.50	20.00	18.00	18.50	19.00	16.00	17.50	18.00
Detroit, Mich.....	17.85	13.85		13.85		22.85	20.35	20.35	18.85	19.35	19.85	17.85	18.35	18.85	15.85	17.35	18.85
Toledo, Ohio.....		13.85		13.85													
St. Louis, Mo.....	17.50	13.50		13.50		22.50	20.00	20.00	18.50	19.00	19.50	17.50	18.00	18.50	15.50	17.00	18.50
Atlanta, Ga.; Alabama City, Ala.; Birmingham, Los Angeles; Pittsburg, Cal.; San Francisco	17.00	13.00		13.00		22.00	19.50	19.50	18.00	18.50	19.00	17.00	17.50	18.00	15.00	16.50	18.00
Minneapolis, Colo.....	16.50	12.50		12.50		21.50	19.00	19.00	17.50	18.00	18.50	16.50	17.00	17.50	14.50	16.00	17.50
Seattle, Wash.....	14.50	10.50		10.50		19.50	17.00	17.00	15.50	16.00	16.50	14.50	15.00	15.50	12.50	14.00	15.50
Portland, Ore.....							15.50	15.50	14.00	14.50	15.00	13.00	13.50	14.00	11.00	12.50	14.00

**BUNDLES** with less than 50% tin coated material are \$5 per gross ton below basic open hearth grades; those with more than 50% tin coated material are \$8 below basic open hearth grades.

**PITTSBURGH** basing point includes switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport. Cincinnati basing point includes Newport, Ky., switching district. St. Louis includes switching districts of Granite City, East St. Louis, Madison, Ill. San Francisco includes switching districts of S. San Francisco, Niles and Oakland, Cal.

**MAXIMUM** prices of inferior grades shall continue to bear same differential below corresponding grades as existed during the period Sept. 1, 1940, to Jan. 31, 1941. Superior grades cannot be sold at a premium without approval of OPA. Special preparation charges in excess of the above prices are banned. Whenever any electric furnace or foundry grades are purchased for open hearth or blast furnace use, prices may not exceed the prices above for the corresponding open hearth grades.

**MAXIMUM SHIPPING POINT PRICE**—Where shipment is by rail or vessel, or by combination of rail and vessel, the scrap is at its shipping point when placed f.o.b. railroad car or f.a.s. vessel. In such cases, the maximum shipping point prices shall be: (a) For shipping points located within a basing point, the price listed in the table above for the scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point and (b) for shipping points located outside the basing point, the price in table above at the most favorable basing point minus the lowest transportation charge by rail or water or combination thereof. Published dock charges prevail, or if unpublished 75c. per ton must be included as part of the deduction.\* Shipping by motor vehicle: The scrap is at its shipping point when loaded. For shipping points located within basing points take price listed in table minus lowest switching charge. If located outside a basing point, the price at the most favorable basing point minus lowest established charge for transporting by common carrier. If no established transportation rate exists, the customary costs are deducted. Published dock charges prevail. If unpublished include 75c.\* For exceptions see official order.

\*At Memphis deduct 50c.; Great Lakes ports \$1; New England \$1.25.

**REMOTE SCRAP:** Defined as all grades of scrap listed in table above located in North Dakota, South Dakota, Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas, Oklahoma, Oregon and Utah. The delivered price of remote scrap may exceed by more than \$1, but not more than \$5, the price at the basing point nearest the consumer's plant, provided detailed statement under oath is furnished OPA. Where delivered price would exceed by more than \$5 the price at basing point nearest consumer, user must apply to OPA for permission to absorb the additional charges. For exceptions see official order.

**UNPREPARED SCRAP:** The maximum prices established hereinabove are maximum prices for prepared scrap. For unprepared scrap, maximum prices shall be \$2.50 less than the maximum prices for the corresponding grade or grades of prepared scrap. In no case, however, shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap." Converter may charge \$2.50 per ton on consumer-owned unprepared remote scrap (see order).

Where scrap is to undergo preparation prior to its arrival at the point of delivery, such scrap is not at its shipping point, as that phrase is defined above, until after preparation has been completed.

**CAST IRON BORINGS:** (No more than 0.5 per cent oil content; for chemical use), add \$5 to price of cast iron borings.

**UNPREPARED CAST IRON SCRAP**—Except for heavy breakable cast, unprepared scrap is given a price ceiling of \$2.50 per ton less than the maximum prices for the corresponding grade of prepared cast iron scrap. Where scrap is to undergo preparation prior to arrival at the point of delivery, such scrap is not considered at shipping point until preparation is completed.

Consumers of cast scrap may pay the shipping point price plus established charge for transporting the scrap to their plants. In the case of deliveries by truck, the cast scrap buyer must obtain from the seller a certification, made out to OPA, of the shipping point, transportation charges and details of the sale.

### RAILROAD SCRAP

(Per gross ton, delivered consumers' plants located on line.)

	No. 1 RR Heavy Melting	Scrap Rails	Rails for Rerolling	Scrap Rails		
				3 ft. and Under	2 ft. and Under	18 in. and Under
Cleveland, Cincinnati, Ashland, Portsmouth, Middletown.....	\$20.50	\$21.50	\$23.00	\$23.50	\$23.75	\$24.00
Canton, Pittsburgh, Sharon, Steubenville, Wheeling, Youngstown....	21.00	22.00	23.50	24.00	24.25	24.50
Chicago, Philadelphia, Sparrows Pt., Wilmington, Birmingham, Los Angeles, San Francisco.....	19.75	20.75	22.25	22.75	23.00	23.25
Buffalo.....	18.00	19.00	20.50	21.00	21.25	21.50
Detroit.....	20.25	21.25	22.75	23.25	23.50	23.75
Duluth.....	18.85	19.85	21.35	21.85	22.10	22.35
Kansas City, Mo.....	19.00	20.00	21.50	22.00	22.25	22.50
Kokomo, Ind.....	17.00	18.00	19.50	20.00	20.25	20.50
Seattle.....	19.25	20.25	21.75	22.25	22.50	22.75
St. Louis.....	15.50	16.50	18.00	18.50	18.75	19.00
	18.50	19.50	21.00	21.50	21.75	22.00

### CAST IRON SCRAP

(Other Than Railroad Scrap)

	Group A	Group B	Group C
No. 1 machinery cast, drop broken, 150 lbs.			
No. 1 cupola cast.....	\$18.00	\$19.00	\$20.00
and under.....	18.00	19.00	20.00
Clean auto cast.....	18.00	19.00	20.00
Unstripped motor blocks.....	17.50	18.50	19.50
Stove Plate.....	17.00	18.00	19.00
Heavy Breakable Cast.....	15.50	16.50	17.50
Charging box size cast.....	17.00	18.00	19.00
Misc. Malleable.....	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C: States not named in A and B; switch district of Kansas City, Kan., Mo.



## 65% Gain in '40 for Dominion's Output

Ottawa, Ont.

••• Canada's production of iron and steel and their manufactures totaled in value \$906,103,055 at factory prices for the year 1940, according to final data compiled by the Dominion Bureau of Statistics. This is a gain of 65 per cent over the total of \$553,468,880 reported for 1939. Number of plants in operation during 1940 was 1433 against 1394 in the preceding year. Plants operating in 1940 represented capital investment of \$837,382,032, employed a monthly average of 164,325 people who were paid \$242,737,569 in salaries or wages and used raw materials to the value of \$454,479,763.

Production in the various groups was as follows:

(000 omitted)	1940	1939
Pig iron, ferroalloys, steel and rolled products .....	\$114,598	\$75,934
Iron castings .....	49,265	32,345
Heating & cooking apparatus .....	20,405	15,351
Boilers, tanks & engines .....	14,865	8,799
Farm implements .....	22,553	16,035
Machinery .....	84,260	48,458
Automobiles .....	189,807	107,463
Automobile parts .....	64,878	38,711
Bicycles .....	2,680	2,054
Aircraft .....	26,567	12,638
Shipbuilding .....	44,690	11,234
Railway rolling stock & parts .....	95,341	60,710
Wire and wire goods .....	32,446	25,063
Sheet metal products .....	64,277	51,527
Hardware, cutlery & tools ..	35,232	22,995
Bridge and structural steel ..	31,230	15,840
Miscellaneous iron & steel ..	13,000	8,303

Total .....\$906,103 \$553,468

Distribution of the above products by provinces follows: Ontario, 809 plants, \$623,197,243; Quebec, 298 plants, \$169,716,578; Nova Scotia, 37 plants, \$35,694,731; British Columbia, 140 plants, \$29,695,789; Manitoba, 61 plants, \$24,516,851; New Brunswick, 23 plants, \$9,887,113; Saskatchewan, 17 plants, \$7,264,432; Alberta, 43 plants, \$5,813,965; Prince Edward Island, 5 plants, \$316,353.

Canada's imports of iron and steel products in 1940 totaled \$298,902,743 against \$183,159,650 in 1939, while exports for the same period were \$127,666,846 and \$63,102,432 for the two years respectively. Re-exports of foreign products advanced to \$2,066,230 in 1940 from \$2,034,999 in 1939.

## Canadian Firm Licensed to Make High Speed Tipped Tools

••• On page 114 of the April 9 issue of THE IRON AGE, the statement was erroneously made that the Oshawa Engineering Co., Oshawa, Ont., had been licensed by the General Tool & Die Corp., of East Orange, N. J., to manufacture Rexalloy tipped tools by a patented process. Instead the Oshawa Engineering Co. has been licensed by

General Tool & Die Corp. to manufacture high speed steel tipped tools by the patented process described in the article "Cutting Tools Tipped with High Speed Steel," which appeared in the March 26 issue of THE IRON AGE, page 53.

The Canadian firm is a distributor of Rexalloy tipped tools, but the tipping process is not covered by the patent referred to above.

## Canada Cuts Bolt And Stove Output

Toronto

••• In an effort to save iron and steel for Canada's war industry, restrictions on production of bolts and screws were announced by the steel controller last week, reducing by 65 per cent sizes that may be manufactured, and it is reported that nails and wire will receive similar treatment. Wire mills have been operating on reduced schedules due to lack of rods.

An order for 900 freight cars has been placed by the Canadian

Pacific Railway Co., as follows: Canadian Car & Foundry Co., Ltd., Montreal, 500 forty-ton steel box cars; National Steel Car Corp., Ltd., Hamilton, Ont., 200 50-ton box cars and 150 70-ton ore cars; Eastern Car Co., Amherst, N. S., subsidiary of Nova Scotia Steel & Coal Co., Ltd., 50 50-ton steel box cars.

Alan H. Williamson, controller of supplies, has ordered only stoves of an approved model, to be manufactured after April 15. The new stoves will be built for utility only. The order determines that the size, shape and design of every stove made after June 1, shall be fixed by the controller, resulting in an estimated iron and steel saving of 16 per cent.

## Harnischfeger Gets Navy E

Harnischfeger Corp., Milwaukee, has been awarded the Navy E pennant. Other Milwaukee concerns honored by the Navy for production achievement are the Lakeside Bridge & Steel Co. and the Louis Allis Co.



## HERE'S LIFE EXTENSION FOR CUTTING TOOLS

When you can't buy all the cutting tools you would like you can be thrifty by extending the life of the tools you now have. To do this you need plenty of good coolant. Production men and machine tool builders have found that it is thrifty to use "Gusher Coolant Pumps." They deliver the coolant to the cutting tools in a split second.

There are no packing glands to bind or adjust—No priming. Any rate of flow from a trickle to a gusher is instantly available three shifts a day, every day. Specify Ruthman Gusher for coolant pumps.



The  
**RUTHMAN**  
Machinery Company  
CINCINNATI, OHIO, U.S.A.  
1821 Reading Road

# Comparison of Prices . . .

(Advances Over Past Week in **Heavy Type**; Declines in *Italics*. Prices Are F.O.B. Major Basing Points)

Flat Rolled Steel: (Cents Per Lb.)	Apr. 21, 1942	Apr. 14, 1942	Mar. 24, 1942	Apr. 22, 1941
Hot rolled sheets.....	2.10	2.10	2.10	2.10
Cold rolled sheets.....	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip .....	2.10	2.10	2.10	2.10
Cold rolled strip .....	2.80	2.80	2.80	2.80
Plates .....	2.10	2.10	2.10	2.10
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00

Tin and Terne Plate: (Dollars Per Base Box)	Apr. 21, 1942	Apr. 14, 1942	Mar. 24, 1942	Apr. 22, 1941
Tin plate .....	\$5.00	\$5.00	\$5.00	\$5.00
Manufacturing ternes ...	4.30	4.30	4.30	4.30

Bars and Shapes: (Cents Per Lb.)	Apr. 21, 1942	Apr. 14, 1942	Mar. 24, 1942	Apr. 22, 1941
Merchant bars .....	2.15	2.15	2.15	2.15
Cold finished bars.....	2.65	2.65	2.65	2.65
Alloy bars .....	2.70	2.70	2.70	2.70
Structural shapes .....	2.10	2.10	2.10	2.10
Stainless bars (No. 302).	24.00	24.00	24.00	24.00

Wire and Wire Products: (Cents Per Lb.)	Apr. 21, 1942	Apr. 14, 1942	Mar. 24, 1942	Apr. 22, 1941
Plain wire .....	2.60	2.60	2.60	2.60
Wire nails .....	2.55	2.55	2.55	2.55

Rails: (Dollars Per Gross Ton)	Apr. 21, 1942	Apr. 14, 1942	Mar. 24, 1942	Apr. 22, 1941
Heavy rails .....	\$40.00	\$40.00	\$40.00	\$40.00
Light rails .....	40.00	40.00	40.00	40.00

Semi-Finished Steel: (Dollars Per Gross Ton)	Apr. 21, 1942	Apr. 14, 1942	Mar. 24, 1942	Apr. 22, 1941
Rerolling billets .....	\$34.00	\$34.00	\$34.00	\$34.00
Sheet bars .....	34.00	34.00	34.00	34.00
Slabs .....	34.00	34.00	34.00	34.00
Forging billets .....	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00

Wire Rods and Skelp: (Cents Per Lb.)	Apr. 21, 1942	Apr. 14, 1942	Mar. 24, 1942	Apr. 22, 1941
Wire rods .....	2.00	2.00	2.00	2.00
Skelp (grv'd) .....	1.90	1.90	1.90	1.90

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 120 to 128 herein. On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Pig Iron: (Per Gross Ton)	Apr. 21, 1942	Apr. 14, 1942	Mar. 24, 1942	Apr. 22, 1941
No. 2 fdy., Philadelphia...	\$25.84	\$25.84	\$25.84	\$25.84
No. 2, Valley furnace....	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti....	24.06	24.06	24.06	24.06
No. 2, Birmingham.....	20.38	20.38	20.38	20.38
No. 2, foundry, Chicago†.	24.00	24.00	24.00	24.00
Basic, de'd eastern Pa....	25.34	25.34	25.34	25.34
Basic, Valley furnace ...	23.50	23.50	23.50	23.50
Malleable, Chicago† .....	24.00	24.00	24.00	24.00
Malleable, Valley .....	24.00	24.00	24.00	24.00
L. S. charcoal, Chicago...	31.34	31.34	31.34	30.34
Ferromanganese† .....	120.00	120.00	120.00	120.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.  
‡For carlots at seaboard.

Scrap: (Per Gross Ton)	Apr. 21, 1942	Apr. 14, 1942	Mar. 24, 1942	Apr. 22, 1941
Heavy melting steel, P'gh.	\$20.00	\$20.00	\$20.00	\$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.85	17.85	17.85	16.50
Low phos. plate, Youngs'n	23.00	23.00	23.00	....
No. 1 cast, Pittsburgh...	22.00	22.00	22.00	23.25
No. 1 cast, Philadelphia..	24.00	24.00	24.00	24.00
No. 1 cast, Ch'go*.....	21.00	21.00	21.00	22.60

\*Changed to gross ton basis April 3, 1941.

Coke, Connellsville: (Per Net Ton at Oven)	Apr. 21, 1942	Apr. 14, 1942	Mar. 24, 1942	Apr. 22, 1941
Furnace coke, prompt ...	\$6.00	\$6.00	\$6.00	\$5.625
Foundry coke, prompt...	6.875	6.875	6.875	6.25

Non-Ferrous Metals: (Cents per Lb. to Large Buyers)	Apr. 21, 1942	Apr. 14, 1942	Mar. 24, 1942	Apr. 22, 1941
Copper, electro., Conn.*..	12.00	12.00	12.00	12.00
Copper, Lake, New York.	12.00	12.00	12.00	12.00
Tin (Straits), New York.	52.00	52.00	52.00	52.50
Zinc, East St. Louis....	8.25	8.25	8.25	7.25
Lead, St. Louis.....	6.35	6.35	6.35	5.70
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

\*Mine producers only.

# Composite Prices . . .

FINISHED STEEL		PIG IRON		SCRAP METAL	
April 21, 1942.....	2.30467c. a Lb.....	.....	\$23.61 a Gross Ton.....	.....	\$19.17 a Gross Ton.....
One week ago .....	2.30467c. a Lb.....	.....	\$23.61 a Gross Ton.....	.....	\$19.17 a Gross Ton.....
One month ago .....	2.30467c. a Lb.....	.....	\$23.61 a Gross Ton.....	.....	\$19.17 a Gross Ton.....
One year ago .....	2.30467c. a Lb.....	.....	\$23.61 a Gross Ton.....	.....	\$19.17 a Gross Ton.....

HIGH		LOW		HIGH		LOW	
1942.....	2.30467c.,	2.30467c.,	2.30467c.,	2.30467c.,	2.30467c.,	2.30467c.,	2.30467c.,
1941.....	2.30467c.,	2.30467c.,	2.30467c.,	2.30467c.,	2.30467c.,	2.30467c.,	2.30467c.,
1940.....	2.30467c., Jan. 2	2.24107c., Apr. 16	2.30467c.,	2.30467c.,	2.30467c.,	2.30467c.,	2.30467c.,
1939.....	2.35367c., Jan. 3	2.26689c., May 16	2.30467c.,	2.30467c.,	2.30467c.,	2.30467c.,	2.30467c.,
1938.....	2.58414c., Jan. 4	2.27207c., Oct. 18	2.30467c.,	2.30467c.,	2.30467c.,	2.30467c.,	2.30467c.,
1937.....	2.58414c., Mar. 9	2.32263c., Jan. 4	2.30467c.,	2.30467c.,	2.30467c.,	2.30467c.,	2.30467c.,
1936.....	2.32263c., Dec. 28	2.05200c., Mar. 10	2.30467c.,	2.30467c.,	2.30467c.,	2.30467c.,	2.30467c.,
1935.....	2.07642c., Oct. 1	2.06492c., Jan. 8	2.30467c.,	2.30467c.,	2.30467c.,	2.30467c.,	2.30467c.,
1934.....	2.15367c., Apr. 24	1.95757c., Jan. 2	2.30467c.,	2.30467c.,	2.30467c.,	2.30467c.,	2.30467c.,
1933.....	1.95578c., Oct. 3	1.75836c., May 2	2.30467c.,	2.30467c.,	2.30467c.,	2.30467c.,	2.30467c.,
1932.....	1.89196c., July 5	1.83901c., Mar. 1	2.30467c.,	2.30467c.,	2.30467c.,	2.30467c.,	2.30467c.,
1931.....	1.99629c., Jan. 13	1.86586c., Dec. 29	2.30467c.,	2.30467c.,	2.30467c.,	2.30467c.,	2.30467c.,
1930.....	2.25488c., Jan. 7	1.97319c., Dec. 9	2.30467c.,	2.30467c.,	2.30467c.,	2.30467c.,	2.30467c.,
1929.....	2.31773c., May 28	2.26498c., Oct. 29	2.30467c.,	2.30467c.,	2.30467c.,	2.30467c.,	2.30467c.,

Weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.



# Prices of Finished Iron and Steel . . .

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point ↓ Product													DELIVERED TO		
	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio	Gulf Ports, Cars **	Pacific Ports, Cars **	Detroit	New York	Phila- delphia
<b>SHEETS</b>															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold rolled <sup>1</sup>	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	3.67¢
Long ternes <sup>2</sup>	3.80¢		3.80¢									4.55¢			
<b>STRIP</b>															
Hot rolled <sup>3</sup>	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢	2.46¢	
Cold rolled <sup>4</sup>	2.80¢	2.90¢					2.80¢		(Worcester = 3.00¢)				2.90¢	3.16¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.56¢	
Commodity C-R	2.95¢			2.95¢			2.95¢		(Worcester = 3.35¢)				3.05¢	3.31¢	
<b>TIN PLATE</b>															
Standard cokes, base box	\$5.00	\$5.00	\$5.00						\$5.10						\$5.32
<b>BLACK PLATE</b>															
29 gage <sup>5</sup>	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ (10)			3.37¢
<b>TERNES, M'FG.</b>															
Special coated, base box	\$4.30	\$4.30	\$4.30						\$4.40						
<b>BARS</b>															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			(Duluth = 2.25¢)		2.50¢	2.80¢	2.25¢	2.49¢	2.47¢
Rail steel <sup>6</sup>	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.50¢	2.80¢			
Reinforcing (billet) <sup>7</sup>	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢	2.25¢	2.39¢	
Reinforcing (rail) <sup>7</sup>	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.50¢	2.55¢	2.25¢		2.47¢
Cold finished <sup>8</sup>	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit = 2.70¢)					3.01¢	2.97¢
Alloy, hot rolled	2.70¢	2.70¢				2.70¢			(Bethlehem, Massillon, Canton = 2.70¢)				2.80¢		
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.45¢		
<b>PLATES</b>															
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.25¢ <sup>(11)</sup>		2.45¢	2.65¢	2.25¢	2.29¢	2.15¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	3.67¢
Alloy	3.50¢	3.50¢							(Coatesville = 3.50¢)		3.95¢	4.15¢		3.70¢	3.37¢
<b>SHAPES</b>															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢			(Bethlehem = 2.10¢)		2.45¢	2.75¢		2.27¢	2.215¢
<b>SPRING STEEL, C-R</b>															
0.26 to 0.50 Carbon	2.80¢			2.80¢					(Worcester = 3.00¢)						
0.51 to 0.75 Carbon	4.30¢			4.30¢					(Worcester = 4.50¢)						
0.76 to 1.00 Carbon	6.15¢			6.15¢					(Worcester = 6.35¢)						
1.01 to 1.25 Carbon	8.35¢			8.35¢					(Worcester = 8.55¢)						
<b>WIRE<sup>9</sup></b>															
Bright	2.60¢	2.60¢		2.60¢	2.60¢				(Worcester = 2.70¢)			3.10¢			2.92¢
Galvanized	2.60¢	2.60¢		2.60¢	2.60¢				(Worcester = 2.70¢)			3.10¢			2.92¢
Spring	3.20¢	3.20¢		3.20¢					(Worcester = 3.30¢)			3.80¢			3.52¢
<b>PILING</b>															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.72¢
<b>IRON BARS<sup>12</sup></b>															
Wrought single refined	4.40¢														
Wrought double refined	5.40¢														

<sup>1</sup> Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. <sup>2</sup> Unassorted 8-lb. coating. <sup>3</sup> Widths up to 12 in. <sup>4</sup> Carbon 0.25 per cent and less. <sup>5</sup> Applies to certain width and length limitations. <sup>6</sup> For merchant trade. <sup>7</sup> Prices for straight length material only, from a producer to a consumer. Functional discount of 25c. per 100 lb. to fabricators. <sup>8</sup> Also shafting. For quantities of 20,000 to 39,999 lb. <sup>9</sup> Carload lot to manufacturing trade. <sup>10</sup> Boxed. <sup>11</sup> Ship plates only. <sup>12</sup> Common iron bars quoted at 2.15c. by Terre Haute, Ind., producer. <sup>13</sup> Gulf and Pacific Ports prices shown here do not apply if the customary means of transportation (rail and water) is not used.

# PRICES

## SEMI-FINISHED STEEL

### Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are \$2 higher; f.o.b. Duluth, billets only, \$2 higher.

Per Gross Ton  
Rerolling ..... \$34.00  
Forging quality ..... 40.00

### Shell Steel

Basic open hearth shell steel, f.o.b. Pittsburgh and Chicago.

Per Gross Ton  
3 in. to 12 in. .... \$52.00  
12 in. to 18 in. .... 54.00  
18 in. and over. .... 56.00

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity.

### Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton  
Open hearth or bessemer. .... \$34.00

### Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

Per Lb.  
Grooved, universal and sheared 1.90c.

### Wire Rods

(No. 5 to 9/32 in.) Per Lb.  
Pittsburgh, Chicago, Cleveland. 2.00c.  
Worcester, Mass. .... 2.10c.  
Birmingham .... 2.00c.  
San Francisco .... 2.50c.  
Galveston .... 2.25c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

### Alloy Steel Blooms, Billets and Slabs

Per Gross Ton  
Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem ..... \$54.00

## TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse) Base per Lb.

High speed ..... 67c.  
Straight molybdenum ..... 54c.  
Tungsten-molybdenum ..... 57½c.  
High-carbon-chromium ..... 43c.  
Oil hardening ..... 24c.  
Special carbon ..... 22c.  
Extra carbon ..... 18c.  
Regular carbon ..... 14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi, 3c. higher.

## PIG IRON

All prices set in bold face type are maxima established by OPA on June 24, 1941. Other domestic prices are delivered quotations per gross ton computed on the basis of the official maxima.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorous	Charcoal
Boston††	\$25.50	\$25.00	\$26.50	\$26.00		
Brooklyn	27.50			28.00		
Jersey City	26.53	26.03	27.53	27.03		
Philadelphia	25.84	25.34	26.84	26.34		
Bethlehem, Pa.	\$25.00	\$24.50	\$26.00	\$25.50		
Everett, Mass.	25.00	24.50	26.00	25.50		
Swedeland, Pa.	25.00	24.50	26.00	25.50		
Steelton, Pa.		24.50			\$29.50	
Birdsboro, Pa.	25.00	24.50	26.00	25.50	29.50	
Sparrows Point, Md.	25.00	24.50				
Erie, Pa.	24.00	23.50	25.00	24.50		
Neville Island, Pa.	24.00	23.50	24.50	24.00		
Sharpsville, Pa.*	24.00	23.50	24.50	24.00		
Buffalo	24.00	23.00	25.00	24.50	29.50	
Cincinnati	24.44	24.61		25.11		
Canton, Ohio	25.39	24.89	25.89	25.39		
Mansfield, Ohio	25.94	25.44	26.44	25.94		
St. Louis	24.50	24.02				
Chicago	24.00	23.50	24.50	24.00		\$31.34
Granite City, Ill.	24.00	23.50	24.50	24.00		
Cleveland	24.00	23.50	24.50	24.00		
Hamilton, Ohio	24.00	23.50		24.00		
Toledo	24.00	23.50	24.50	24.00		
Youngstown*	24.00	23.50	24.50	24.00		
Detroit	24.00	23.50	24.50	24.00		
Lake Superior fc.						\$28.00
Lyles, Tenn. fc.†						33.00
St. Paul	26.63		27.13	26.63		
Duluth	24.50		25.00	24.50		
Birmingham	20.38	19.00	25.00			
Los Angeles	27.50					
San Francisco	27.50					
Seattle	27.50					
Provo, Utah	22.00					
Montreal	27.50	27.50		28.00		
Toronto	25.50	25.50		26.00		

## GRAY FORGE IRON

Valley or Pittsburgh furnace ..... \$23.50

\*Pittsburgh Coke & Iron Co. (Sharpsville, Pa., furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

††Eastern Gas & Fuel Associates, Boston, is permitted to sell pig iron produced by its selling company, Mystic Iron Works, Everett, Mass., at \$1 per gross ton above maximum prices.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade (1.75 per cent to 2.25 per cent).

Phosphorous Differentials: Basing point prices are subject to a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over.

†Price shown is for low-phosphorous iron; high-phosphorous sells for \$28.50 at the furnace. Manganese Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.50 per cent manganese content in excess of 1.00 per cent.

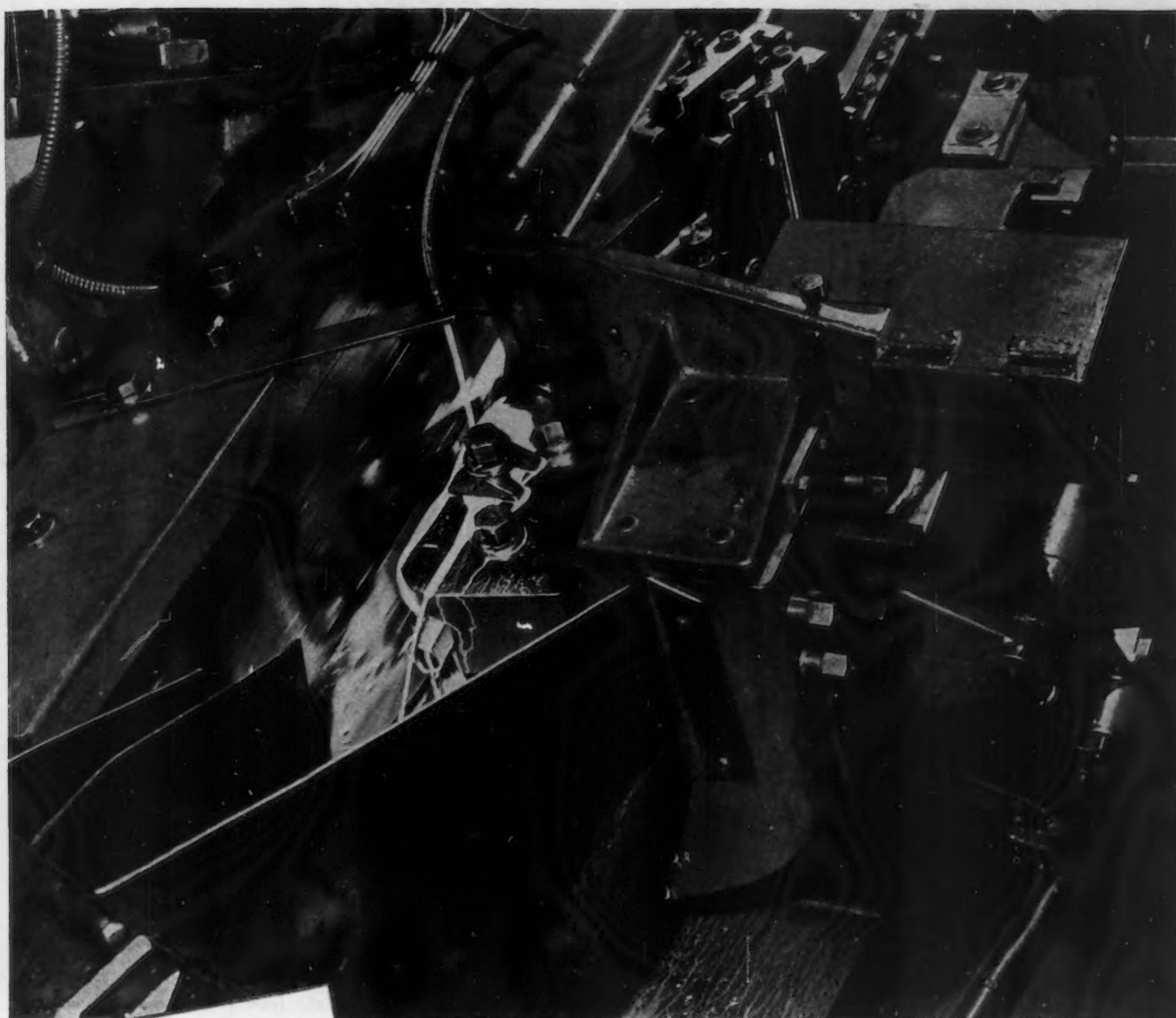
## WAREHOUSE PRICES

(Delivered Metropolitan areas, per 100 lb. See THE IRON AGE, Dec. 25, 1941, page 88, for details of OPA Price Schedule No. 49, covering steel resale prices. These prices do not necessarily apply for dislocated tonnage shipments when the f.o.b. city prices are used in conformance with Schedule 49.)

	Pittsburgh	Chicago	Cleveland	Philadelphia	New York	Detroit	Buffalo	Boston	Birmingham	St. Louis	St. Paul	Milwaukee	Los Angeles
Sheets, hot rolled	\$3.35	\$3.25	\$3.35	\$3.55	\$3.58	\$3.43	\$3.25	\$3.71	\$3.45	\$3.39	\$3.50	\$3.38	\$4.95
Sheets, cold rolled		4.10	4.05	4.05	4.60	4.30	4.30	4.68		4.24	4.35	4.23	7.50
Sheets, galvanized	4.65	4.85	4.62	5.05	5.00	4.84	4.75	5.11	4.75	4.99	5.00	4.98	5.95
Strip, hot rolled	3.60	3.60	3.50	3.51	3.96	3.68	3.82	4.06	3.70	3.74	3.85	3.73	4.90
Strip, cold rolled	3.20	3.50	3.20	3.31	3.51	3.40	3.52	3.46		3.61	3.83	3.54	
Plates	3.40	3.55	3.40	3.55	3.76	3.60	3.62	3.85	3.55	3.69	3.80	3.68	4.90
Structural shapes	3.40	3.55	3.58	3.55	3.75	3.65	3.40	3.85	3.55	3.69	3.80	3.68	4.60
Bars, hot rolled	3.35	3.50	3.25	3.85	3.84	3.43	3.35	3.98	3.50	3.64	3.75	3.63	4.35
Bars, cold finished	3.65	3.75	3.75	4.06	4.09	3.80	3.75	4.13	4.43	4.02	4.34	3.88	6.60
Bars, ht. rld. SAE 2300	7.45	7.35	7.55	7.31	7.60	7.67	7.35	7.75		7.72	7.45	7.58	9.55
Bars, ht. rld. SAE 3100	5.75	5.65	5.85	5.86	5.90	5.97	5.65	6.05		6.02	6.00	5.88	8.55
Bars, cd. drn. SAE 2300	8.40	8.40	8.40	8.56	8.84	8.70	8.40	8.88		8.77	8.84	8.63	10.55
Bars, cd. drn. SAE 3100	6.75	6.75	7.75	7.16	7.19	7.05	6.75	7.23		7.12	7.44	6.98	9.55

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb., galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: Chicago, galvanized sheets, 500 to 1499 lb.; Philadelphia, galvanized sheets, one to nine bundles, cold rolled sheets, 1000 to 1999 lb.; Detroit, galvanized sheets, 500 to 1499 lb.; Buffalo, cold rolled sheets, 500 to 1500 lb., galvanized sheets, 450 to 1499 lb., cold rolled strips, 0.0971 in. thick; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; Birmingham, hot rolled sheets, strip and bars, plates and shapes, 400 to 3999 lb., galvanized sheets, 500 to 1499 lb.; St. Louis, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb., cold rolled strip 0.095 in. and lighter; Milwaukee, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb., New York, hot rolled sheets, 0 to 1999 lb., cold rolled sheets, 400 to 1499 lb.; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, cold rolled sheets, 300 to 1999 lb.; galvanized sheets, 1 to 6 bundles; cold finished bars, 1 to 99 lb.; SAE bars, 100 lb. Extras for size, quality, etc., apply on above quotations. \*12 gage and heavier, \$3.43.





How much  
hangar can  
a finger-flick  
build?

*Cold forged full threads of R B & W bolts are clean and sharp, with accurate lead and pitch, giving uniform load distribution and preventing stripping. Nuts, faced or semi-finished, have the bearing face at right angles to the hole, assuring stud alignment . . . with lead end counter-bored, after tapping, for quick start.*

HOW IMPORTANT is a *single* bullet in a machine gun cartridge clip? How vital is *one* out of 2000 incendiary bombs dropping from a single Yankee plane over Tokio? How much faster can a hangar be built by *quick*-assembling bolts and nuts?

A nut with a cranky thread . . . a bolt with a badly-formed head . . . are like bullets that miss, bombs that are duds. War industries want nuts that run on smoothly with a flick of the fingers, bolts that take wrench-tightening without injury.

High on the list of suppliers to the builders of fighting equipment — the airports, the tanks, the battleships, tractors

and big guns — is R B & W, whose service to America is one bolt, one nut multiplied by millions . . . tons . . . carloads. The men who know best what quick assembly means, specify R B & W's Empire brand for bolts and nuts that are clean-threaded, accurately-matched and sturdy.

Our three great plants are strategically located for Industrial America's convenience.

#### **RUSSELL, BURDSALL & WARD**

Russell, Burdsall & Ward Bolt and Nut Company, established 1845. Factories at Port Chester, N. Y., Rock Falls, Ill., Coraopolis, Pa.; sales offices at Philadelphia, Chicago, Detroit, Chattanooga, Los Angeles, San Francisco, Portland, Seattle.

## **RB&W**

*Making strong the things that make America strong*



AND ALLIED FASTENING PRODUCTS...SINCE 1845

# PRICES

## CORROSION AND HEAT-RESISTING STEEL

(Per lb. base price, f.o.b. Pittsburgh)

### Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets .....	21.25c.	20.40c.
Bars .....	25.00c.	24.00c.
Plates .....	29.00c.	27.00c.
Structural shapes .....	25.00c.	24.00c.
Sheets .....	36.00c.	34.00c.
Hot rolled strip .....	23.50c.	21.50c.
Cold rolled strip .....	30.00c.	28.00c.
Drawn wire .....	25.00c.	24.00c.

### Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F. Billets	15.73c.	16.15c.	19.13c.	23.38c.
Bars .....	18.50c.	19.00c.	22.50c.	27.50c.
Plates .....	21.50c.	22.00c.	25.50c.	30.50c.
Sheets .....	26.50c.	29.00c.	32.50c.	36.50c.
Hotstrip .....	17.00c.	17.50c.	24.00c.	25.00c.
Cold st. .....	22.00c.	22.50c.	32.00c.	52.00c.

### Chromium-Nickel Clad Steel (20%)

	No. 304
Plates .....	18.00c.*
Sheets .....	19.00c.

\*Includes annealing and pickling.

## ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade .....	3.20c.
Armature .....	3.55c.
Electrical .....	4.05c.
*Motor .....	4.95c.
*Dynamo .....	5.65c.
Transformer 72 .....	6.15c.
Transformer 65 .....	7.15c.
Transformer 58 .....	7.65c.
Transformer 52 .....	8.45c.

Silicon strip in coils—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 75c. per 100 lb.

\*In some instances motor grade is referred to as dynamo grade and dynamo grade is referred to as dynamo special.

## ROOFING TERNE PLATE

(F.o.b. Pittsburgh, per Package of 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C. ....	\$6.00	\$12.00
15-lb. coating I.C. ....	7.00	14.00
20-lb. coating I.C. ....	7.50	15.00
25-lb. coating I.C. ....	8.00	16.00
30-lb. coating I.C. ....	8.63	17.25
40-lb. coating I.C. ....	9.75	19.50

## BOLTS, NUTS, RIVETS, SET SCREWS

### Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)  
Per Cent Off List

#### Machine and Carriage Bolts:

6½ in., shorter and smaller .....	65½
6 x ¾ in., and shorter .....	63½
6 in. by ¾ to 1 in. and shorter .....	61
1½ in. and larger, all length .....	59
All diameters over 6 in. long .....	59
Lag, all sizes .....	62
Plow bolts .....	65

#### Nuts, Cold Punched or Hot Pressed:

	(Hexagon or Square)
¾ in. and smaller .....	62
9/16 to 1 in. inclusive .....	59
1½ to 1½ in. inclusive .....	57
1½ in. and larger .....	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts	U.S.S.	S.A.E.
7/16 in. and smaller .....	62	64
¾ in. and smaller .....	62	64
¾ in. through 1 in. ....	60	60
9/16 to 1 in. ....	59	59
1½ in. through 1½ in. ....	57	58
1½ in. and larger .....	56	56

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose .....	71 and 10
Stove bolts in packages, with nuts attached .....	71
Stove bolts in bulk .....	80

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York lots of 200 lb. or over.

### Large Rivets

(¾ in. and larger)

	Base per 100 lb.
F.o.b. Pittsburgh, Cleveland Chicago, Birmingham .....	\$3.75

### Small Rivets

(7/16 in. and smaller)

	Per cent Off List
F.o.b. Pittsburgh, Cleveland Chicago, Birmingham .....	65 and 5

### Cap and Set Screws

Per cent Off List

Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and smaller .....	60
Upset set screws, cup and oval points .....	68
Milled studs .....	40
Flat head cap screws, listed sizes .....	30
Filister head cap, listed sizes .....	46

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

## WIRE PRODUCTS

(To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham)

	Base per Keg
Standard wire nails .....	\$2.55
Coated nails .....	2.55
Cutnails, carloads .....	3.85

	Base per 100 Lb.
Annealed fence wire .....	\$3.05

	Base Column
Woven wire fence* .....	67
Fence posts (carloads) .....	69
Single loop bale ties .....	59
Galvanized barbed wire† .....	70
Twisted barless wire .....	70

\*15½ gage and heavier. †On 80-rod spools in carload quantities.

Note: Birmingham base same on above items, except spring wire.

## BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes

Minimum Wall  
(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

	Lap	Seamless	Weld
	Cold	Hot	Hot
	Drawn	Rolled	Rolled
2 in. o.d. 13 B.W.G. ....	15.03	13.04	12.38
2½ in. o.d. 12 B.W.G. ....	20.21	17.54	16.58
3 in. o.d. 12 B.W.G. ....	22.48	19.50	18.35
3½ in. o.d. 11 B.W.G. ....	28.37	24.62	23.15
4 in. o.d. 10 B.W.G. ....	35.20	30.54	28.66

(Extras for less carload quantities)

	Base
40,000 lb. or ft. over .....	5%
30,000 lb. or ft. to 39,999 lb. or ft. ....	10%
20,000 lb. or ft. to 29,999 lb. or ft. ....	20%
10,000 lb. or ft. to 19,999 lb. or ft. ....	30%
5,000 lb. or ft. to 9,999 lb. or ft. ....	45%
2,000 lb. or ft. to 4,999 lb. or ft. ....	65%
Under 2,000 lb. or ft. ....	65%

## STEEL AND WROUGHT IRON PIPE AND TUBING

### Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills  
(F.o.b. Pittsburgh only on wrought pipe)

Base Price—\$2.00 Per Net Ton

### Steel (Butt Weld)

	Black	Galv.
½ in. ....	63½	51
¾ in. ....	66½	55
1 to 3 in. ....	68½	57½

### Wrought Iron (Butt Weld)

½ in. ....	24	3½
¾ in. ....	30	10
1 and 1½ in. ....	34	16
1½ in. ....	38	18½
2 in. ....	37½	18

### Steel (Lap Weld)

2 in. ....	61	49½
2½ and 3 in. ....	64	52½
3½ to 6 in. ....	66	54½

### Wrought Iron (Lap Weld)

2 in. ....	30½	12
2½ to 3½ in. ....	31½	14½
4 in. ....	33½	18
4½ to 8 in. ....	32½	17

### Steel (Butt, extra strong, plain ends)

	Black	Galv.
½ in. ....	61½	50½
¾ in. ....	65½	54½
1 to 3 in. ....	67	57

### Wrought Iron (Same as Above)

½ in. ....	25	6
¾ in. ....	31	12
1 to 2 in. ....	38	19½

### Steel (Lap, extra strong, plain ends)

2 in. ....	59	48½
2½ and 3 in. ....	63	52½
3½ to 6 in. ....	66½	56

### Wrought Iron (Same as Above)

2 in. ....	33½	15½
2½ to 4 in. ....	39	22½
4½ to 6 in. ....	37½	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher on all butt weld 8 in. and smaller.

## CAST IRON WATER PIPE

Per Net Ton

6-in. and larger, del'd Chicago .....	\$54.80
6-in. and larger, del'd New York .....	52.20
6-in. and larger, Birmingham .....	46.00
6-in. and larger f.o.b. dock, San Francisco or Los Angeles or Seattle .....	56.00

Class "A" and gas pipe, \$3 extra; 4-in. pipe is \$3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger is \$45 at Birmingham and \$53.80 delivered Chicago.

## FUEL OIL

No. 3, f.o.b. Bayonne, N. J. ....	5.20c.
No. 6, f.o.b. Bayonne, N. J. ....	3.21c.
No. 6 Bur. Stds., del'd Chicago .....	4.50c.
No. 3 distillate del'd Cleveland .....	6.50c.
No. 4 indus., del'd Cleveland .....	6.00c.
No. 6 indus., del'd Cleveland .....	5.00c.



# MESTA

HEAT TREATED  
SPECIAL ALLOY STEEL  
BACKING UP  
**ROLLS**



Mesta Heat Treated  
Special Alloy Steel Backing-Up Roll  
in a Mesta Heavy Duty Roll Grinder



MESTA MACHINE COMPANY • PITTSBURGH, PA.

# PRICES

## FERROALLOYS

### Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans, Domestic, 80%, per gross ton (carloads) .....\$120.00

### Spiegeleisen

Per Gross Ton Furnace  
Domestic, 19 to 21% .....\$36.00  
Domestic, 26 to 28% ..... 49.50

### Electric Ferrosilicon

(Per Gross Ton, Delivered Lump Size)  
50% (carload lots, bulk) .....\$74.50  
50% (ton lots, packed) ..... 87.00  
75% (carload lots, bulk) .....135.00  
75% (ton lots, packed) .....151.00

### Silvery Iron

(Per Gross Ton, base 6.00 to 6.50 St)  
F.o.b. Jackson, Ohio .....\$29.50\*  
Buffalo .....30.75\*  
For each addition 0.50% silicon add \$1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add \$1 a ton for 0.75% phosphorus or over.  
\*Official OPACS price established June 24.

### Bessemer Ferrosilicon

Prices are \$1 a ton above Silvery Iron quotations of comparable analysis.

### Ferrochrome

(Per Lb., Contained Cr. Delivered Carlots, Lump Size, on Contract)  
4 to 6 carbon .....13.00c.  
2 carbon .....19.50c.  
1 carbon .....20.50c.  
0.10 carbon .....22.50c.  
0.06 carbon .....23.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

### Silico-Manganese

(Per Gross Ton, Delivered, Lump Size, Bulk, on Contract)  
3 carbon .....\$113.00\*  
2.50 carbon ..... 118.00\*  
2 carbon ..... 123.00\*  
1 carbon ..... 133.00\*

### Other Ferroalloys

Ferrotungsten, per lb. contained W, del'd carload ..... \$2.00  
Ferrotungsten, 100 lb. and less ..... 2.25  
Ferrovanadium, contract, per lb. contained V, del'd \$2.70 to \$2.90†  
Ferrochromium, per lb. contained Cr, f.o.b. Niagara Falls, N. Y., ton lots ..... \$2.25†  
Ferrocarbontitanium, 15-18 Ti, 7-8 C, f.o.b. furnace, carload, contract, net ton .....\$142.50  
Ferrocarbontitanium, 17-20 Ti, 3-5 C, f.o.b. furnace, carload, contract, net ton .....\$157.50  
Ferrophosphorus, electric or blast furnace material, carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage freight, equalized with Rockdale, Tenn., gross ton ..... \$58.50  
Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., \$3 unitage, freight equalized with Nashville, gross ton ..... \$75.00  
Ferromolybdenum, per lb. Mo, f.o.b. furnace ..... 95c.  
Calcium molybdate, per lb. Mo, f.o.b. furnace ..... 80c.  
Molybdenum oxide briquettes 48-52 Mo, per lb. contained Mo, f.o.b. Langeloth, Pa. .... 80c.  
Molybdenum oxide, in cans, per lb. contained Mo, f.o.b. Langeloth, and Washington, Pa. .... 80c.

\*Spot prices are \$5 per ton higher.  
†Spot prices are 10c. per lb. of contained element higher.

## ORES

### Lake Superior Ores (51.50% Fe.)

(Delivered Lower Lake Ports)  
Per Gross Ton  
Old Range, bessemer, 51.50 .....\$4.75  
Old range, non-bessemer, 51.50 ..... 4.60  
Mesaba, bessemer, 51.50 ..... 4.60  
Mesaba, non-bessemer, 51.50 ..... 4.45  
High phosphorus, 51.50 ..... 4.35

### Foreign Ores\*

(O.f. Philadelphia or Baltimore, Exclusive of Duty)  
Per Unit  
African, 46-48 Mn. ....66.5c. to 68c.  
Indian, 48-50 Mn. ....68c. to 70c.

### Furnace

Per Net Ton  
†Connellsville, prompt .....\$6.00

### Foundry

†Connellsville, prompt. \$6.75 to \$7.00

\*Maximum by-product coke prices established by OPA became effective Oct. 1, 1941. A complete schedule of the ceiling prices was published in THE IRON AGE, Sept. 25, p. 94B. Maximum beehive furnace coke prices established by OPA, Jan. 26. †F.O.B. oven.

## COKE\*

By-product, Chicago .....\$12.25  
By-product, New England .....\$13.75  
By-product, Newark. \$12.40 to \$12.95  
By-product, Philadelphia .....\$12.38  
By-product, Cleveland .....\$12.30  
By-product, Cincinnati .....\$11.75  
By-product, Birmingham .....\$8.50†  
By-product, St. Louis .....\$12.02  
By-product, Buffalo .....\$12.50

## RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb., gross ton .....\$40.00  
Angle bars, 100 lb. .... 2.70  
(F.o.b. Basing Points) Per Gross Ton  
Light rails (from billets) .....\$40.00  
Light rails (from rail steel) ... 39.00  
Base per Lb.  
Cut spikes ..... 3.00c.  
Screw spikes ..... 5.15c.  
Tie plates, steel ..... 2.15c.  
Tie plates, Pacific Coast ..... 2.30c.  
Track bolts, heat treated, to railroads ..... 5.00c.  
Track bolts, jobbers discount.. 63-5

Basing points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minneapqua, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond, Va.

## FLUORSPAR

Fire Clay Brick Per Net Ton  
Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail .....\$25.00  
Domestic, f.o.b. Ohio River landing barges ..... 25.00  
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines ..... 25.00  
Foreign, 85% calcium fluoride, not over 5% Si, c.i.f. Atlantic ports, duty paid ..... Nominal  
Domestic No. 1 ground bulk, 96 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines ....\$34.00  
As above, in bags, f.o.b. same mines ..... 36.40

## REFRACTORIES

(F.o.b. Works)

Fire Clay Brick Per 1000  
Super-duty brick, St. Louis...\$64.60  
First quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois ..... 51.30  
First quality, New Jersey ..... 56.00  
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois ..... 46.55  
Second quality, New Jersey... 51.00  
No. 1, Ohio ..... 43.00  
Ground fire clay, net ton ..... 7.60

### Silica Brick

Pennsylvania .....\$51.30  
Chicago District ..... 58.90  
Birmingham ..... 51.30  
Silica cement, net ton (Eastern) 9.00

### Chrome Brick

Per Net Ton  
Standard, f.o.b. Baltimore, Plymouth Meeting and Chester...\$54.00  
Chemically bonded, f.o.b. Baltimore, Plymouth Meeting and Chester, Pa. .... 54.00

### Magnesite Brick

Standard f.o.b. Baltimore and Chester .....\$76.00  
Chemically bonded, f.o.b. Baltimore ..... 65.00

### Grain Magnesite

Domestic, f.o.b. Baltimore and Chester in sacks .....\$44.00  
Domestic, f.o.b. Chewelah, Wash. (in bulk) ..... 22.00